FLIGHT
and
AIRCRAFT ENGINEER

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The Outlook

Confounding the Critics

LANDPLANE protagonists—and they appear to be in the majority—have been fond of arguing that if an aircraft had to come down in the open sea, it would matter little whether it was a landplane or a flying boat; it would sink quickly in any case. We on this journal have never shared that view, but hitherto the actual proof of our contention has been lacking. Now the Boeing 314 flying boat has provided it in most convincing fashion.

Whether or not the *Sky Queen* should ever have started on the flight with the passengers and fuel which she did carry, and in the weather conditions obtaining at the time, is another matter altogether, and one that concerns the American authorities rather than ours. We are concerned only with the fact that a flying boat has come down in mid-Atlantic, in a high wind and with a heavy sea running, has not only alighted safely but has remained afloat for some 24 hours and thus given valuable time in which to rescue all on board. It is doubtful that a landplane in the same circumstances would have floated for as many minutes.

Some of those who share our views on flying boats have rather rebuked us for publishing, in our issue of October 9th, an article which made the most of the shortcomings and handicaps from which this type of aircraft is claimed to suffer. We felt that on its merits—if they are honestly stated—the flying boat could stand the criticism levelled at it in that article, and we are not so bigoted that we cannot admit the right of others to hold views different from our own.

The events of the *Sky Queen* rescue make some of Capt. Brice's statements read rather amusingly now, and it is unfortunate for him that he should have picked as an example of the type of flying boat suffering from operational drawbacks the Boeing 314 with a swell limitation of 3½ to 4ft. He was, of course, referring to *regular* operation, but there is a long gap between his figure and that encountered in the recent rescue. No one would suggest that flying boats should operate regularly from the open sea, but the knowledge that an emergency alighting can be made successfully is very reassuring.

One interesting feature of the long survival of the Boeing is that this type is fitted with sponsons. British flying-boat designers have never favoured these (although, as the late Sir Sefton Brancker once said; they do provide convenient platforms for embarking and disembarking passengers), and have preferred wing-tip floats because they offer less drag and also afford a more powerful righting moment for a given displacement. In a rough sea, however, they are somewhat vulnerable to damage unless the supporting structure is made a good deal stronger than is usually the case.

Alternatives

CAPT. BRICE also stressed the lack of alternatives such as are available to the landplane (his actual words were: "To talk of indiscriminate landings on any likely water as a suitable alternative is crazy"). He appeared particularly worried about the large flying boat (he quoted a 200-tonner). The fact that seaworthiness is, other things being equal, proportional to size, and that thus the number of "likely waters" available to the large flying boat for emergency alightings must be greater, appears to us to be in favour of the large flying boat *vis a vis* its landplane counterpart. Capt. Brice would have us believe that the world is simply bristling with alternative airfields. But is it? If we take as an example the *Brabazon*, the largest landplane under construction in this country, there is at the present moment not one runway in this country which would take the machine, and the question of cost is likely to rule out the construction of more than one or two. It is by no means certain that in an emergency either of these would be

within reach, and a forced landing away from a proper base would be likely to have fatal consequences. It might be argued that with multiple power plant no forced landing should ever be necessary. That argument applies equally to the flying boat, but knowing the fallibility of anything made by human hands, we would rather legislate for the remote possibility—and travel in a type of aircraft which, as proved by the recent event, would have a good chance in an emergency of putting down safely and remain afloat for a considerable time.

Turbines: Taking Stock

TWO years before any other journal, *Flight* was giving its readers details of projected and existing turbine units, of the historical background, the implications of the advent of a new form of power unit, and of the problems as we saw them. There followed a great awakening to the possibilities of gas turbines and 500 and 1,000 m.p.h. bombers and air transports were freely forecast. Even the engine designers publicly proclaimed: "Give us the airframes and we will do the rest," and "forget the large piston engine from now on and we will produce a turbine with airscrew for the slower transports."

Just when the more sober-minded aircraft engineers were beginning to know some of the answers, the enormity of the problems set by the "fly very high and fast" maxim for efficiency began to be fully understood. To-day scientists are still groping in their approach to the higher Mach numbers. Pressurization for over 20,000ft is still a novelty and the air conditioning that must go with it, very much in the experimental stages, while high-altitude weather conditions are not proving to be as calm and clear as had been confidently foreshadowed by meteorologists. Solid progress is often painfully slow.

Thus we are forced to the realization that given the airframes, and in spite of most creditable progress, the engine designers are unable as yet to "do the rest." Furthermore, airline operators expect a minimum period between engine overhauls of 500 hours; at present they are offered little more than a quarter of that time.

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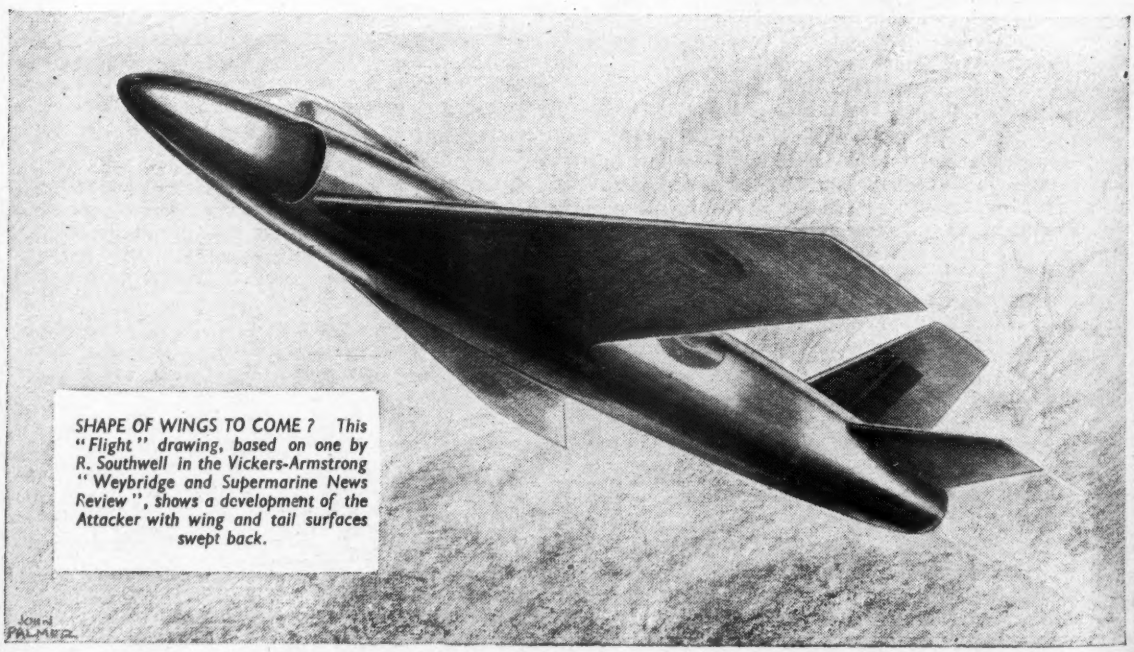
It is only now being generally appreciated that gas turbines tend to be inflexible, and this has an adverse effect upon economy of operation. Take, for example, an airliner with four turbo jets designed for the North Atlantic service, and operating economically at, say, 500 m.p.h. at 30,000ft. Airborne time at such a speed is the important factor, and g.p.h. is not the figure to consider, it is a.m.p.g. that gives the true comparison with existing aircraft. However, on arrival at one of the overcrowded terminal airports, should there be delay, holding time, representing useless expenditure of fuel, is the same for the Brabazon as for a Tiger Moth, and g.p.h. becomes the important figure and the one for direct comparison. Another consumption problem might occur following the failure of one power unit. Adequate power remains but the change in operating conditions may entirely alter the consumptions of the three operative units.

As a result of turbine over-optimism, we again take stock of our large piston engines and find the cupboard rather bare—and what it contains mostly adaptations from military units. These temporary setbacks in no way shake our faith in gas turbines, but it is well to face facts and appreciate that operation of turbine-powered airliners must await further development.



SHAPE OF WINGS TO COME? This "Flight" drawing, based on one by R. Southwell in the Vickers-Armstrong "Weybridge and Supermarine News Review", shows a development of the Attacker with wing and tail surfaces swept back.

The Safir's good performance and manœuvrability definitely place it in the sports class.

Safir in the Air

An Analysis of the Equipment and Flying Qualities of a New Swedish Three-seater : S.A.A.B. 91 with Gipsy Major 10 Engine

Illustrated by "Flight" photographs

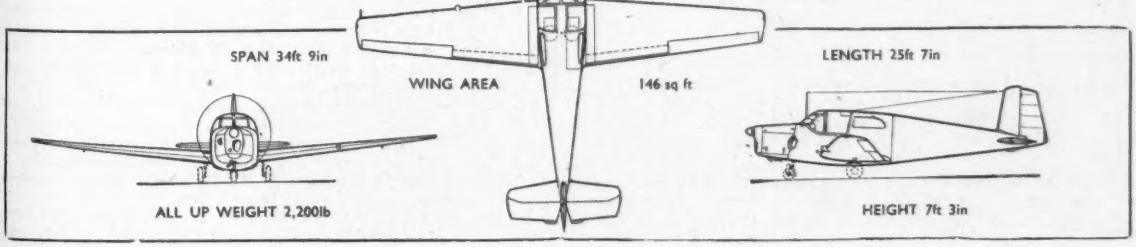
By W/C. MAURICE A. SMITH, D.F.C.

SEVERAL new private owner aircraft have been brought over to this country from the Continent and America since the war, and it has been my privilege to fly and describe a good many of them.* Latest addition to the list is the Swedish S.A.A.B. 91 or *Safir*, made by the Svenska Aeroplan A.B. of Linkoping. Since it first flew eleven months ago, I have looked forward to the chance to pilot this particular machine, which has many attractive features. It may be classed somewhere between the two-seat 85 h.p Globe Swift and four-seat 165 h.p. Beechcraft Bonanza. All three are chiefly or wholly of metal construction, each is definitely a sports machine with particularly good performance, and all have retractable landing wheels. The Safir has a 145 h.p. Gipsy Major X engine with D.H. v.p. airscrew, and the interest of my air experience in this aircraft was increased because it was my first try-out of the Mark 10 engine and small hand-variable airscrew.

Briefly, the layout and characteristics of the Safir are as follows: It is a three-seater, single-engined, low-wing, cabin monoplane with nose-wheel undercarriage. The construction is all of metal with stressed-skin covering everywhere except on control surfaces and the main planes aft of the spar. The seats are arranged two side-by-side and one to the rear offset to starboard. Beside it are the fuel tank and luggage compartments. It is understood that the Safir is shortly to be granted a C. of A. for all normal flying and aerobatics other than flick manœuvres.

Obviously a great deal of thought has gone into the planning of the cabin, and everywhere are seen examples of ingenious devices and arrangements which add to the machine's convenience, comfort and utility, without adding unduly to the cost. British constructors might spend a worthwhile hour looking over the cockpit of the Safir. Take as an example the seat attachment. Pilot and front passenger sit on large cushions which clip into "buckets." Tilt and height are adjusted simply by inserting two projections from the bucket frame into one of three pairs of slots in the supporting structure, and small sprung bolts locate the front ends. Under the buckets are large wells which give access to the control linkages and are large enough to carry maps, computor or other belongings if safely stowed to avoid fouling the rods. To enable bulky objects to be transported, or if the machine should be required to carry stretchers, the back of the front

**Belfair, Ercoupe, KZ II, KZ VII, Norecrin, Super Cruiser, Seebee, Chipmunk*



Safir in the Air . . . . .

passenger's seat and the whole of the third seat can be removed or replaced in seconds with the aid of clips and tongue and recess-type fittings.

The controls are neatly and conveniently arranged. The rudder pedals are of separate swinging type and on the pilot's (port) side, toe brakes are fitted. The dual pedals can be disconnected and clipped up horizontally and the dual stick is also quickly removable. Both the sticks are tubular, unencumbered and roughly "S" shaped, and their attachments, roughly below the seat forward edges, leave a completely clear floor space.

An exceptional feature is the cabin internal width of four feet. This ensures adequate elbow room and also gives space between the seats for undercarriage and flap levers. These levers protrude from a slightly forward-sloping panel and in flying position both lie horizontally out of the way. A small spring-loaded door folds over each of the slots in the panel and in the case of the undercarriage lever, acts as a down lock. Tail trim is also adjusted by means of a small lever located between the seats, and the fuel cock with reserve position, completes this group of controls.

Layout of Panels

A word of praise is also due for the instrument layout. In front of the pilot is a neat, six-instrument flying panel; centrally, and level with it, are the engine instruments and fuel gauge, while on the starboard side is the radio. Lower down on the central pedestal are grouped the electrical switches and ammeter, and, just below, an ash tray which folds out of a recess. Concealed behind this ash tray, which has a double catch, are the fuses.

A great effort has been made to ease the exit and entry problem, and the low tricycle landing gear has done away with the need to scramble up a high, sloping wing root. The enclosure hinges along its top line on both sides, and the large doors have "up" supports with catches.

Double flap-over leather seat tops are provided to step on without spoiling the upholstery. For entry to the third seat one either climbs over the one in front (with its back folded flat), or opens an even larger hinged portion of the canopy and steps in over the side. The whole enclosure can be jettisoned in emergency and, incidentally, the rear release handle needs a protecting cover like the front ones.

There is room for improvement in the silencing of the cabin, not from the engine, which is particularly quiet, but from built-in noises. A main source is the clear vision panel which is provided with a rather inferior catch and seal. The three ventilators are also responsible for a good deal of noise. Having achieved low engine noise the makers would be well advised again to check over cabin details and external finish to reduce the whistling and rumbling and so permit conversation without the need to shout.

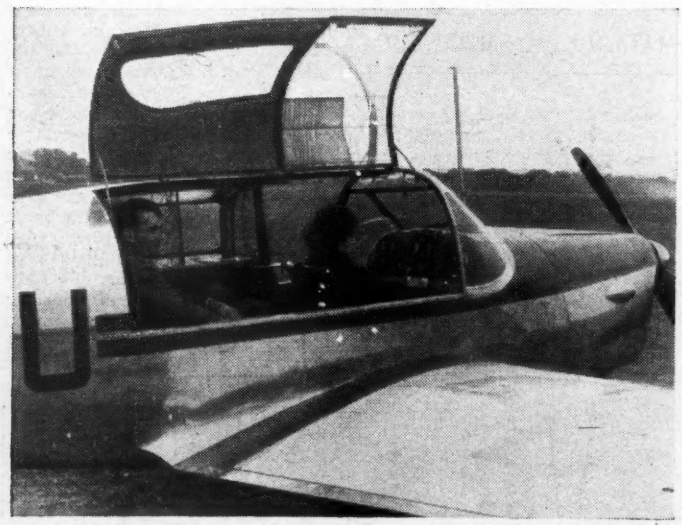
A not very elegant view of the Safir, it nevertheless bears witness to its manoeuvrability and shows the landing wheels in the retracted position.

Above the fuel tank (behind the pilot) is the luggage rack which has a sliding string net cover. An interior roof light is provided, also sun blinds. Behind the rear seat are zip fasteners giving access to the inside of the rear fuselage. Sutton type harness is provided, the machine being fully aerobatic. Having obtained a good clear floor space, the purpose of placing the electric starter button (and its safety cover) in the middle of it is obscure. A better position for the winding handle and pitch indicator of the v.p. airscrew has still to be found and I would also prefer to see the nearby boost gauge grouped with the rest of the engine instruments.

Before turning to the performance and handling I feel a mention of the pitot head and some other exterior details should be made. The pitot on the port wing tip is purposely stressed for use as a grip for ground handling of the Safir and a dummy pitot is fitted on the starboard side for the same purpose. A landing light is built into the port wing leading edge at about mid span and the rear navigation light is in the tip of the fin, peeping back over the rudder which it overlaps. A spring tail skid is fitted as a precautionary measure but the nose wheel takes a fair proportion of the aircraft weight.

The exhaust pipe of the Gipsy Major X, an engine which I found both smooth and responsive, is of new design and has a single convergent outlet pipe through the under cowling between Nos. 2 and 3 cylinders. It is reminiscent of early ejector stubs fitted to Merlin engines.

I flew the Safir from the West London Aero Club at White Waltham on October 10th. It was



The need for providing a convenient cabin entry and exit, a quality disregarded in many light aircraft, has been recognized, and three very large panels in the canopy, hinged along the top line, make it possible to step straight into or out of the roomy interior.

One of the best features of the Safir is its roomy, well-equipped and well-planned cockpit. The manual control for the airscrew on the D. H. Gipsy Major X engine is seen as a temporary fitting above the pilot's throttle and mixture control levers.

in the care of S/L. M. D. Creighton, of R. K. Dundas, Ltd., the agents in this country. After a demonstration circuit I taxied out and decided that control on the ground was good. The brake pedals might have been adjusted to a more comfortable angle, but once the toes are firmly on them they work efficiently and smoothly. The parking brake is of the "press the pedals and pull the knob" type as, for instance, on the Harvard. The rubber pedals can be adjusted during flight.

There are one or two ridges on the field at White Waltham and the nose wheel which is anchored on the bulkhead behind the engine took rather a beating. The full movement of the oleo seems to be used up on occasions and there is a tremendous bang, forward. The take-off is made without any tendency to swing and the aircraft flies off when it is ready with stick very slightly back. I found it best to keep the stick back to relieve the nose wheel of weight when taking off over rough grass.

The airscrew is set at 1 on the pitch indicator and the climb is made at a setting of 4 to 6. It is up to the pilot to decide whether to wind the pitch a little coarser on leaving the ground and afterwards to retract the wheels, or to retract first and ignore a tendency to over-rev for a second or two as speed builds up. Either action entails a change of hands on the stick and the release of the throttle lever on the port side of the cockpit. The pitch can be altered with the left hand, but it would be desirable to make it a more comfortable action when the final fitting of the control is settled. In the meantime Safir pilots should practise left-hand take-offs, and should make a double check of the throttle friction nut before moving off.

The action of retracting or lowering the three wheels—purely mechanical—calls for surprisingly little effort, although had it been possible it might have been easier, and more logical, to operate the lever in the opposite sense, i.e., pull up for wheels up. Admittedly the lever would then have been less conveniently positioned in flight. The undercarriage-down safety cover is lifted just before opening the throttle and the lock is released by twisting the rubber grip through 90 deg before pushing the lever forward, and twisting to relock. The flaps have three positions and half-flap is used for take-off. There is very little load on the flap lever either for lowering or raising, and not much change of trim.

One of the best performances of the Safir is its rate of climb, and initially this is quite up to the 1,050ft/min claimed. Flown solo with full tanks the climb was in the region of 1,150ft/min at 80 m.p.h. (2,300 r.p.m. and −1lb boost). While getting used to the feel of the machine I checked its other speeds and found that for normal cruising 146 m.p.h. at 2,050 r.p.m. seemed best, with the airscrew pitch indicator set at 10, the full-coarse pitch position. This is in keeping with the manufacturers' economical figure. I next fined off the pitch to give 2,300 r.p.m. and −1¼lb boost, and at 3,000ft the speed built up to 158 m.p.h. indicated. The maximum speed claimed with this engine and at full load of 2,200lb is 164 m.p.h., and as the maximum r.p.m. permitted for the Gipsy Major X are 2,550 it is probable that the top speed with one passenger is about 165 m.p.h. —very creditable for a roomy cabin machine using only 145 h.p.

Turning to the other end of the speed range I found that with an all-up weight of about 1,800lb (two passengers and full tanks) the stall with engine off came at indicated speeds of 61 m.p.h. with no flap, 57 m.p.h. with half-flap and 55 m.p.h. with full flap. Testing what would be critical speed on the approach I found that with wheels down and some power, a slight shudder heralding the stall is felt at 59 m.p.h. I should add that to obtain this speed with a little engine on and only half-flap the nose had to be held fairly high.

Ailerons and the Stall

When the aircraft is stalled the nose drops quite abruptly, and with the stick held full back, the left wing showed a tendency to drop. Response to recovery action is immediate and the Safir exhibits a rather unusual characteristic at the stall, namely, the retention of aileron control even though the nose is falling. If one forgets a "don't" of one's early training and endeavours to pick up a stalled wing with aileron, the action is likely in this case to be successful. The unusual effectiveness of the large ailerons does, in fact, dominate all the handling characteristics of the Safir.

While I have no particular quarrel with the controls of the Safir I would say that, while good, they are not among the sweetest I have used. All three have the feeling of a somewhat larger aircraft, and the ailerons in particular give

This semi-plan view shows, in particular, the good proportions of the aircraft, but somewhat angular appearance of its fabric-covered controls.

Safir in the Air . . . . .

the impression of being geared up. The Safir makes good medium turns without the aid of the rudder and even on the change over, if made slowly and smoothly, there is little or no skid or slip tendency to correct. Out of interest, and remembering how the Norecrin will turn on rudder, assuming its own bank, I tried making a rudder turn with the Safir. This was a complete failure, and the only result was considerable yaw with wings remaining more or less level.

For a single-engine machine with wide fuselage and well-proportioned fin the Safir is surprisingly stable directionally. SE-BFU, the particular machine I tested, was not trimmed as well as it might have been; this may have been due to accidental adjustment of the rather vulnerable sheet metal trim tabs projecting behind the control surfaces. Although it remained stable with hands off, at speeds in excess of 110 m.p.h., it endeavoured to fly slightly but distinctly crabwise, with nose to port. The machine behaves well on very steep turns, and if the stick is held excessively far back it eventually flicks smoothly over into a turn in the opposite direction.

The pilot's position is well forward and a good view is obtained over the leading edge, and, in fact, in all directions, although if luggage is carried there would be some restriction of the view to the rear.

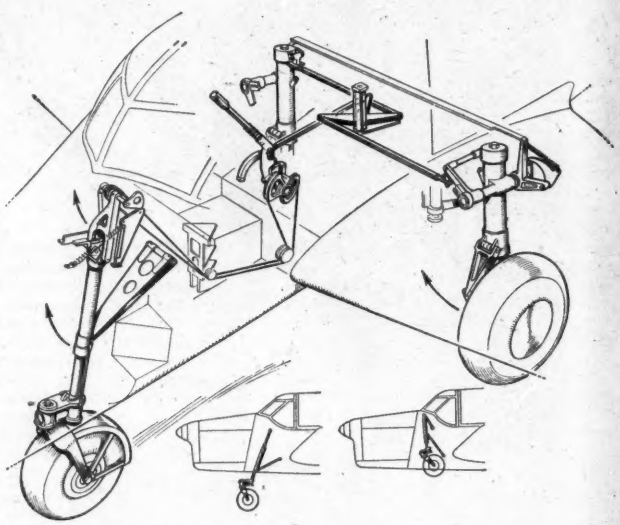
For the first few landings I thought it best to make a fairly wide approach, and having reduced speed to about 90 m.p.h. I lowered the wheels and tested the warning horn (for what it is worth), there being no indicator lights. Incidentally, the horn is operated by suction from the engine induction manifold and is fitted with a cut-out button. I reduced the pitch to 2 on the indicator, which from full coarse entails 10 or 12 turns of the crank and having commenced final approach, found that even with a strong wind, full flap was desirable to keep the approach steep. The tail trimmer must be used for comfort and it is sensitive. Eighty m.p.h. dropping to 75 over the boundary seemed to be comfortable speeds, and check and touch-down presented no difficulty. I must confess to finding the landing (or is it arrival?) much the same as on all small nosewheel aircraft, an action calling for some judgment but none of the finesse required to three-point some of the old biplanes. I do not suggest, of course, that this is not an advance towards the simple handling desirable for the day when thousands will own their own light aircraft.

After about an hour's general flying I decided to drop my passenger and try my hand at some aerobatics. I was assured that the Safir is fully aerobatic, but could not find anyone who had at that time tried a loop or roll and could give me some ideas on speeds. Having secured seats and straps and tightened my own Sutton harness I took off again and climbed as high as cloud would permit—about 2,000ft. The only other aircraft I could see in the sky was an Anson well away to the south, so I started off with a gentle loop with airscrew pitch at about No. 8 and a going-in speed of 155 m.p.h. The Safir flew round with the greatest of ease with an over-the-top speed of about 65 m.p.h. It did not need keeping straight and there was no tendency at all to flick on top or as I pulled it out of the dive.

Next I tried a roll to the right and out of habit took an overgrip with my right hand and used full aileron. The speed was again about 155 m.p.h. and I was astonished at the rate of roll, smoothness and ease with which the Safir came out. A roll to the left, which often seems easier on a side-by-side machine, did not come off quite so well. The rate of roll was less and it was necessary to work harder with the rudder to prevent the machine swishing out as the roll was completed. I tried two or three more rolls in each direction and a couple of climbing rolls, but while those to the right continued to come off very well I did not manage to get the left rolls up to the same standard. I have discussed this point with S/L. Creighton who subsequently rolled the Safir and he had the same experience. We are now wondering if the characteristic is linked with the suspected trimming fault and crabwise tendency in level flight.

During the aerobatics the Safir maintained its height without difficulty, and before landing I tried some rolls off the top with an entry speed of about 165 m.p.h. and found that these can be made with precision and full control. A somewhat ambitious hesitation roll started well but ended in some loss of height and a rather undignified skid out. I blame that on myself, not the Safir.

I look forward to spending a day or two with the Safir when I shall be better able to judge its merits as a touring machine. I have no doubt that it will appeal to a great many pilots and it should find a ready market. In these days when one expects to pay the earth for a small aircraft, a price of £2,690 plus £423 duty does not seem at all unreasonable. The de luxe model is £300 more



The layout of the mechanics of the Safir's tricycle undercarriage.

SAFIR PERFORMANCE DATA

De Havilland 145 h.p. Gipsy Major X engine

Take-off run	590ft	Max normal range	585 miles
Landing run	500ft	Stalling speed	53/56 m.p.h.
		v.p. airscrew	f.p. airscrew
Max speed		164 m.p.h.	158 m.p.h.
Max cruising speed		154 m.p.h.	140 m.p.h.
Economical cruising		146 m.p.h.	127 m.p.h.
Rate of climb		1,050ft/min	785ft/min
Service ceiling		15,100ft	14,100ft

AIR EVACUATION AGAIN

B.O.A.C. have undertaken a further air evacuation operation in India, which will probably be the largest in history. The Corporation and five British charter companies—Westminster Airways, Silver City Airways, Scottish Aviation, Air Contractors and Jersey Airways—have already sent Dakotas to Delhi, twelve of which were supplied by the charter companies, and B.O.A.C. are urgently considering the possibility of using Yorks. having regard, of course, to normal passenger service commitments. This operation will probably be more difficult than the earlier one, since, although Delhi is again the base from which evacuation will take place, the destinations are scattered. Figures indicating the extent of evacuation flying by the R.A.F. appear on page 484 of this issue.

NEW HAWKER TEST PILOT

SQUADRON LEADER T. S. ("WIMPEY") WADE, D.F.C., A.F.C., will join Hawker Aircraft, Ltd., at the end of the month as a test pilot. He will assist Mr. Humble in the trials of the N.7/46 jet fighter and, when not thus occupied, will pass out production Furies and Sea Furies as these leave the production line.

From October, 1943, to January, 1946, S/L. Wade was O.C. Flying at the Fighter Development Unit and has an almost unique background of experience in the performance and handling testing of high-speed fighters. It fell to his lot to fly comparative trials of Allied and German aircraft, including the Me109 and Fw190. Since the war he has become known as a test pilot/journalist.

Casual Commentary

Need for Continued Piston-Engine Development : A Word for the Corporations : "Drag-Consciousness"

By "ROBERT CARLING"

ATRUISM often forgotten is that technical problems always, in their solution, bring others in their wake. Just as the development of really large landplanes may eventually need to mark time while airfield construction goes ahead to permit their use, so, it would seem, the future success of the pure jet and airscrew-turbine units will depend on the solution of present air-traffic-control problems.

Indeed, were it technically possible to put turbine-powered civil aircraft into service tomorrow, the control problems involved in their use would still cause them to remain grounded. The reason is all too simple and there is certainly no sign of any early solution of the difficulties. Whereas it is easy enough to make adequate allowances in fuel reserves on a speed and distance basis, it is by no means so easy to do so on a time basis. And in bad weather it will take the flying control people just as long to bring in a series of turbine-powered aircraft as it will to bring in those with piston engines. Turbine consumptions, as we all know, are high, and little variation is at present possible; the higher cruising speeds which keep the overall consumption within "payload" limits will be precious little use when aircraft are stacked above a terminal—though they may enable the crew to choose and reach a clear airfield further afield.

Of course, this traffic problem will eventually be solved, but there may be delays even beyond those which are already being accepted in the development of the turbines themselves. So it is all the more vitally important that we should press ahead with the work on our piston engines—both in obtaining the higher take-off powers which will allow them to compete on even terms, weight for weight, with the turbines, and, more important still, in the extension of their present inter-overhaul periods.

There is no point in deluding ourselves over this last point. Our high-powered civil engines, at least, are considerably inferior, in the length of their inter-overhaul lives and maintenance costs, to American engines. Even the "paper" figures are low by comparison, and any maintenance engineer will tell you that these figures are rarely if ever reached.

That genuinely long inter-overhaul periods are possible is shown not only by the records of certain American engines, but also by the better records of at least one of our own engines of somewhat lower power. The fact that all our higher-powered piston engines are variations of military units, which were designed to an entirely different set of power and life requirements, is neither here nor there. Civil operation requires easy maintenance and a period of at least 750 hours between overhaul. If we can offer that *and* really high take-off powers (a difficult combination, I admit) we can still show a clean pair of piston-engined heels to the Americans—one or two of whose latest engines, one hears, are being changed at hourage figures which might shock even the cynical engineers of our maligned Corporations.

Short Memories

And very much maligned, at present, two of these Corporations certainly are. No doubt they are top-heavy in their organization and consequently lacking in the mobility of smaller privately owned concerns. No doubt they suffer from the faults of all cumbersome, oversized machines—whether State-run or otherwise. But one cannot help thinking that the memories of politicians and public are sometimes remarkably short.

When B.E.A. were formed, for instance, those who accepted high administrative posts were told, in effect, to spare no expense in bringing their Corporation up to the highest level of operating magnificence and to pay little heed to trading losses while the giant edifice was being constructed. Behold, now, the edifice which, though only partially constructed, is already to lose a fair proportion of its human masonry as the economy axe falls.

Meanwhile, the executives have probably found that the job of running an airline has very little to do, strangely enough, with that of running an airline. The latter is likely to be only a small and comparatively straightforward part of it. The greater portion of their time may be devoted to something which can only be described as "political"—the completion of agreements, the placating, perhaps, of civil servants, or the study of the vast mountain of literature which always accumulates when international committees go into action. It is almost a life work to read and understand even the straightforward and practical aircraft operating requirements produced by I.C.A.O.—or by our own A.R.B.

No doubt it is all necessary—but I would just as soon, as a passenger, trust a good designer and a honest airline operator to give me safety. One wearies of all these theoretical forms of safety. As if a single-engined rate of climb equal to $0.057 \frac{V^{1.5}}{s_1}$ is going to make the pilot's struggle much less great—and your life depends on the amount of struggling which may be necessary. I would rather fly in an aircraft with good asymmetric handling qualities, but a poor rate of climb, than in one which, with the best engine-failure rate of climb in the world, must be balanced on the edge of a high-lift flick stall.

But to return to our overworked executives in their *politburos*. When they do get time off to look at the airline operating business they find that they are expected to obtain results from an assorted hotch-potch of uneconomic military conversions, or, perhaps, from a fleet of partially developed interim types. Would you expect the L.P.T.B. to offer a dividend if this august body had restarted its peacetime operations with a few hundred lorries, originally designed for military purposes but fitted with passenger bodies, each requiring an engine change once a fortnight and limited to special passenger loads along certain streets?

Studying the Operator

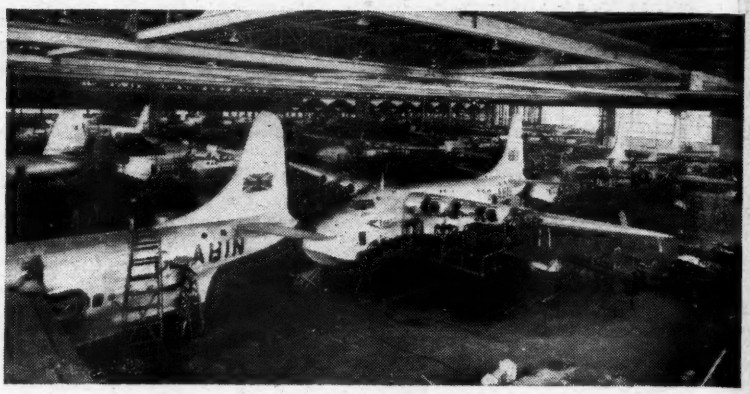
The time is certainly long overdue for the proper consideration, in this country of, airline-operating requirements, and for the production of more aircraft which can really pay for themselves. And this does not necessarily mean that we must return to the box-kite formula for big payloads. By careful design we can have our high speeds with a reasonable wing loading and in return for a low cruising power-output. High powers will always be necessary for brief use during and immediately after take-off—unless we are to return to pre-war ideas in wing loadings and cruising speeds—if only to maintain engine-failure safety, but the power required for cruising need never be high if we can keep the drag down.

Following a remark I heard recently from a transatlantic technician, who said that even in America the aircraft constructors were only just beginning to be "drag-conscious," I made some very approximate calculations. This technician was adamant in his demand for a reduction of unnecessary drag if airline operation at modern speeds and high utilizations was to pay for itself, and could point to only one British aircraft the design of which was based on a belief in the economy of efficiency.

In my calculations this particular aircraft was matched against an obsolescent type designed some years ago for rather similar airline duties. The former aircraft cruises with a payload greater by some 4,000 lb at a speed some 50 m.p.h. higher for a slightly lower expenditure of power. Since its all-up weight is much higher, a very considerably greater maximum power is necessary and available for take-off, but over long stages the total fuel consumption compares very favourably in spite of the higher speed and the greater load-carrying capacity of the more modern aircraft.

This same technician quoted the case of an operator on the other side of the Atlantic who had found that it actually paid to buy D.C.4s, while waiting for D.C.6s which were on order, rather than to continue to use Dakotas. This operator was possibly carrying big regular loads which involved the duplication of Dakota services, and the Dakotas themselves may have been old and expensive to maintain—but the case provides an almost startling example of the possible value of aerodynamic efficiency.

HERE AND THERE



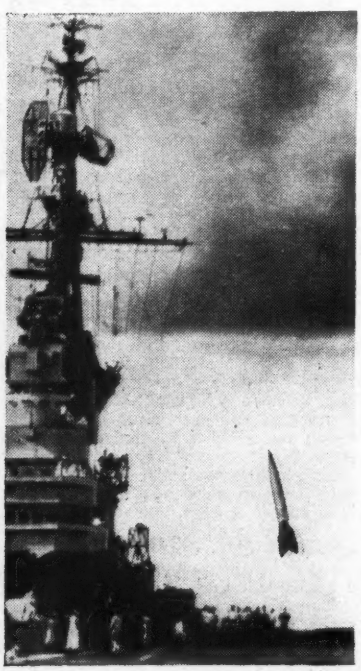
FINISHING TOUCHES: A line of "Solent" class flying boats in the sheds of Short and Harland Ltd., Belfast. The boats are built at Rochester and flown to Belfast for internal fittings, power plant change (to Hercules 730s.) and final flight trials before being delivered to the B.O.A.C. flying boat base at Hythe, Southampton Water, for its Empire routes.

New French Air Attaché

COLONEL P. STEHLIN, O.B.E., who was formerly Assistant Air Attaché at the French Embassy, has now been appointed Air Attaché. He succeeds Colonel H. G. de Rancourt de Mimérand, C.B.E., D.F.C., A.F.C., who has held the post since March 29th, 1945, and who, it is understood, is to return to France for active service with the French Air Force. Colonel Stehlin has been on the Embassy staff since March, 1946.

Ayrshire's New Industry

PLANS are being completed to make Prestwick, Ayrshire, one of the biggest 'bus-building centres in Great Britain. Already a £65,000 order has been placed with Scottish Aviation, Ltd., for thirty-eight single-deck type 32-seater buses. Because there is a shortage of service aircraft available for conversion for civil airlines, equipment built for converting Dakotas is to be switched to the new industry.



ROCKETRY: In "Flight" Sept. 11th. we reported that a V.2 Rocket was to be launched from the U.S. aircraft carrier "Midway". Here the rocket is depicted at the start of its journey. Note its size in comparison with the men on the flight deck.

S.A.S. Session

MR. H. P. SORENSEN, Lord Mayor of Copenhagen, and Mr. Rudolph Schmidt, Chairman of the Danish Merchants' Association and a Director of D.D.L., were visitors at the inauguration of an exhibition opened by Scandinavian Airlines System in Copenhagen on October 11th.

New U.S. Jet Fighter

THE first swept-back-wing fighter—the XP 86—designed for the U.S.A.A.F., is now undergoing ground tests in California prior to its first flight test. Apart from its swept-back wings and tail surfaces, the aircraft is somewhat similar in design to the North American XFJ-1 jet fighter built for the U.S. Navy, which made its first flight late last year.

Rates Halved

TRANS-CANADA AIRLINES have halved their fares for the carriage of food parcels on their transatlantic service between Canada and England. The new charge, which started on October 15th, covers the cost of local delivery in England, and T.C.A. hope to provide a 48-hour delivery service, thus making consignments of fresh food by air available at a reasonable cost.

Turbine Topics

AN industrial gas turbine course covering land, marine and locomotive installations, is to start at the National Gas Turbine Establishment's school at Ladywood Works, Lutterworth, on November 10th. The course, which will include all aspects of gas turbine technology, including fluid and thermal dynamics, practical and theoretical testing procedure and analysis, will last for three weeks. Engineers wishing to attend the course should apply to Power Jets (Research and Development), Ltd., 8, Hamilton Place, London, W.1.

American Research

IN America, the Atomic Energy Commission has announced that for the next four years the University of Chicago will operate the Clinton Laboratories, one of the three nuclear energy plants at Oak Ridge, Tennessee, which has hitherto been operated by the Monsanto Chemical Company. Plans for the development of the plant include the setting up of a new high-flux reactor several times more powerful than the existing Oak Ridge pile, and a continued effort to apply atomic power to industry.

Fund Finance

THE Royal Aero Club's Hospitality Fund, the opening of which was announced in these columns on August 21st, now totals £330 15s including subscriptions for the month ending September 12th. The Fund was inaugurated so that the hospitality accorded British visitors by foreign aero clubs may be returned in the form of at least one big R.Ae.C. International Rally each year.

DERBY VISIT: Marshal of the R.A.F. Lord Tedder photographed in company with Mr. E. W. Hives (managing director) and Mr. A. G. Elliott (director and chief engineer) during a visit to the Rolls-Royce Research and Development establishment at Derby.

Tasman Crossing

INGENUITY and enterprise lie behind the story of Mr. Harry B. Newton's recent solo air crossing of the Tasman Sea. Newton, formerly a F/L. in the R.N.Z.A.F., found it impossible to get

HERE AND THERE

a sea passage from Europe to New Zealand, so he worked in a Belgian aircraft factory until he had saved enough money to buy a 75 h.p. Ercoupe, then flew from Antwerp to Darwin in 16 days. After leaving Lord Howe Island for Norfolk Island, Newton struck murky weather and decided to carry on the 850 miles to Auckland. He used a Wellington radio station broadcasting a speech by New Zealand's Minister of Finance for homing until he picked up the beam from Whenuapai airfield, where he landed safely. His flight was the sixth solo crossing of the Tasman Sea.

B.G.A. Competition

THE British Gliding Association has announced that the Judging Committee has chosen the winners of the Two-Seater Design Competition for the Duke of Sutherland's prize (£125) and second and third prizes awarded by the Royal Aero Club. Their decision has been confirmed by the Council of the B.G.A.

The winners are:—

1. H. Kendall.
2. D. J. Farrar and L. G. McFarlane.
3. A. O. Mattocks.

Looking Ahead

THE 1948 Machine Tool and Engineering Exhibition which will be held at Olympia from August 26th to September 11th, 1948, is expected to be the largest show of machine tools, woodwork machine equipment and accessories ever staged in Great Britain. The three halls of Olympia have been booked providing nearly a quarter of a million square feet of space for the exhibition, which will be international in scope, and in which foreign exhibits will be shown side by side with British equipment so that users will be able to compare their respective merits and observe the developments that have taken place.

Model Man

MR. BRISTOW, of Woodley, Reading, who appeared in the B.B.C.'s Picture Parade televised from Radiolympia on October 2nd, can surely be described as a master model maker. During his 40 years' experience in constructing models, he has built 4,000 miniature aircraft, including replicas of the Short Solent, Supermarine Spitfire Mk. 21 and earlier aircraft of the 1914-1918 period, such as the R.E.8, F.E.8, and Nieuport Night Hawk.

DANISH VISITOR: Mr. Erik Hoff-Hansen, Percival's Danish agent, recently visited the Luton factory. He is seen here bidding farewell to the Hon. Mrs. Ruth Moore, publicity manager, before leaving in a Proctor V.

MAN AND MODEL: With this 8ft wing span, scale flying model Tiger Moth, Mr. Bristow hopes to achieve successful radio-controlled flight. The model cost several hundred pounds to construct.

News in Brief

THE Ministry of Defence has announced that a meeting of Commonwealth scientific representatives is to be held in London next month to discuss defence problems. Sir Henry Tizard, Chairman of the Defence Research Policy Committee, will preside.

* * *

Captain Hubert S. Broad, M.B.E., A.F.C., who earlier in the year joined the staff of Dowty Equipment, Ltd., as outside representative to effect liaison with airline operators and R.A.F. stations, will in future also handle the public relations work of this company.

* * *

Lord Tedder, Chief of Air Staff, recently visited the Rolls-Royce factory at Derby.

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Australia has announced that £75,000,000 is to be spent on naval expansion. In addition to two aircraft carriers being built in Britain, Australia is to construct four heavy destroyers from British Admiralty blue prints.

* * *

Professor P. I. Dee, C.B.E., F.R.S., and Sir William Griffiths, D.Sc., F.R.I.C., F.Inst.P., F.I.M., have been appointed Members of the Advisory Council for Scientific and Industrial Research from October 1st, 1947.

* * *

On Wednesday, October 22nd, at the Royal United Service Institution, Whitehall, Air Marshal Sir Hugh Lloyd, K.B.E., C.B., M.C., D.F.C., was due to deliver a lecture entitled "Allied Air Power in the Mediterranean, 1940-1945."

Work has started on a 120ft long concrete runway which will cross the G.W.R. line at North Filton, near Bristol. It is being built for the Brabazon aircraft to cross from its erection shed to its take-off position.

* * *

Capt. Smith-Clarke, Director, Chief Engineer and General Manager of Alvis, Ltd., has been appointed Chairman of the Automobile Division of the Institute of Mechanical Engineers. Captain Smith-Clarke was elected a member of the Council of the Institute of Automobile Engineers in 1933 and was a Vice-President at the date of the merger with the Institute of Mechanical Engineers.

Capt. Smith-Clarke, M.I.Mech.E., F.R.Ae.S.

* * *

John K. Northrop, President of Northrop Aircraft, Inc., and a pioneer designer of all-wing aircraft, was recently awarded the Spirit of St. Louis Medal by the American Society of Mechanical Engineers "for meritorious service in the advancement of aeronautics." He is the seventh person to receive this honour.

* * *

Dr. Plesman, President of K.L.M. (Royal Dutch Airlines), is leader of the K.L.M. delegation which attended the I.A.T.A. Traffic Conferences and General Executive Committee meetings at Rio de Janeiro.

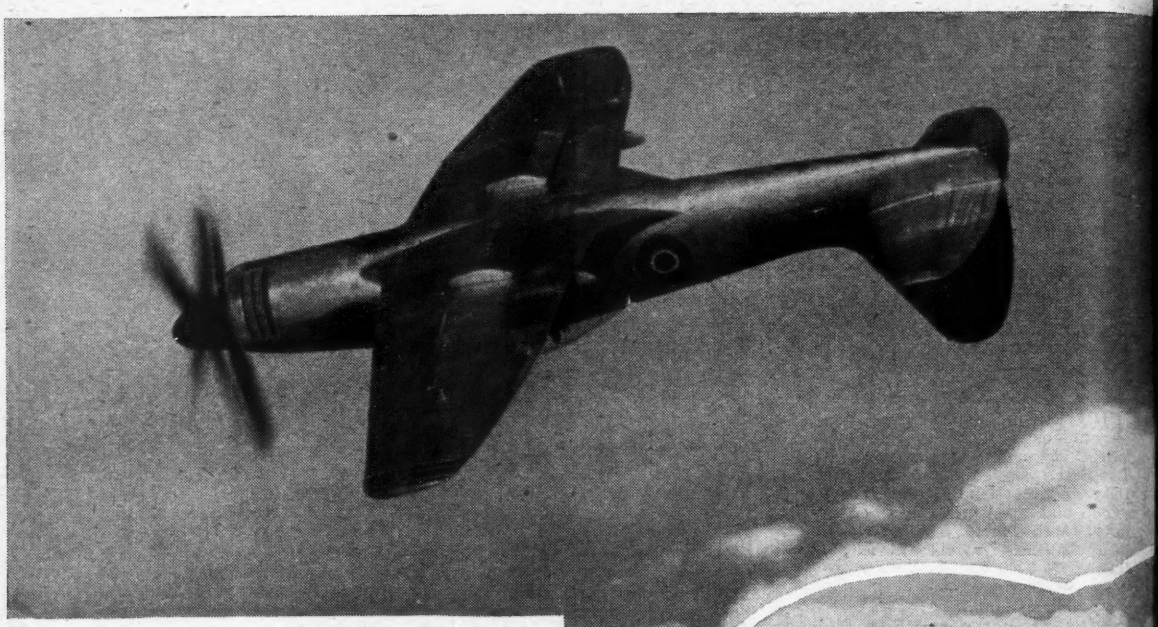
* * *

D.D.L. have purchased six Douglas C.47s from U.S.A.F. surplus stocks for 135,000 dollars. They are to be used exclusively for freighting.

* * *

Mr. R. W. Harker, who was in charge of the Flying Liaison Department of Rolls-Royce at Hucknall, has now been appointed to the Aero-Engine Sales Department in the London office of Rolls-Royce in Conduit Street.

Mr. Harker has been with Rolls-Royce Limited since 1925.



S/L. P. J. GARNER

Photographs of his Last Flight in the Westland Wyvern

ON Wednesday, October 15th, S/L. P. J. Garner, Assistant Chief Test Pilot of Westland Aircraft Ltd., met with a fatal accident while testing the first prototype Wyvern. During this last flight he had also posed the Wyvern for our camera. These two pages of photographs are published as a last tribute to a test pilot of quite exceptional calibre.

The photographic flying had been carried out over the Chesil Bank area, and on the way back Peter reported by R/T that there was trouble with his contra-rotating airscrew, and asked that the airfield should be kept clear for an emergency landing.

His next R/T report was that "the front prop. has gone," followed shortly after by "I can maintain height at 2,400 with 145 on the A.S.I. I'm using nearly full left rudder." Shortly afterwards came his last remark, "I shan't make it, am forced landing"

The field he selected was perfect for its purpose, and seen from the air the aircraft appeared to be fairly intact, with the exception of the airscrew and engine which had bowled on a farther 50 or 60 yards. It must be surmised that Garner was knocked out by the violence of the landing impact and, unfortunately, was unable to get out of the cockpit before being overwhelmed by the fire which broke out.

Under terrible circumstances Peter Garner had showed the mettle of which he was made. He had had enough height to use his parachute, but tried to land the Wyvern intact. His voice over the R/T was entirely unemotional, and the position of the crash in relation to the line of flight from where the photographs had been taken makes it certain in my mind that he deliberately crash-landed where he did rather than attempt to get into Yeovil airfield and take the chance of falling short and crashing in the town, which closely adjoins the airfield boundary.

Peter Garner was 25 years of age and had 950 hours in his log books He joined the R.A.F. in 1940 and in 1941 volunteered to serve with the Merchant Ship Fighter Unit. Service with this unit meant being catapulted in a Hurricane from the deck of merchant ships in convoy, and when fuel ran out, either parachuting or landing in the sea and waiting to be picked up. After a tour with the M.S.F.U. he was attached to Naval Aviation for deck landings.

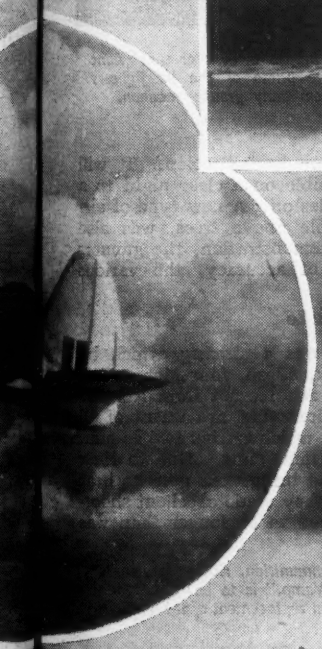
Bottom right: The take-off from Yeovil airfield. Centre: Climbing into the bright sunshine above the clouds. Top right: At the conclusion of the photography S/L. Garner formated closely for what must be the most intimate air to air picture ever taken. In the background photograph he had just rolled the Wyvern on to its back.

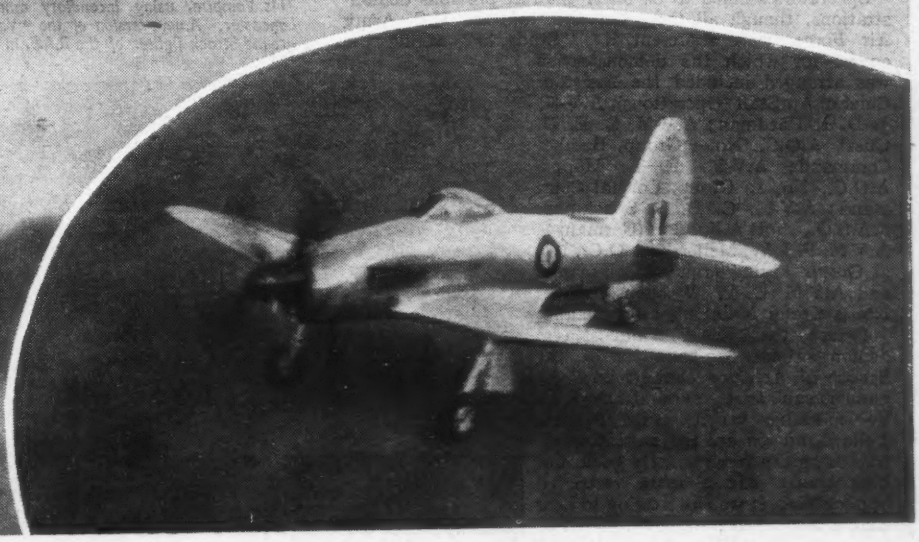
In 1943 he volunteered to fly Mosquito Intruders, and was for a while with No. 605 (County of Warwick) A.A.F. Squadron.

On completion of three tours of operations he was appointed Staff Officer to H.Q. Fighter Command as Intruder Controller.

He later completed a full Empire Test Pilots' Course and, in February, 1946, joined Westlands as assistant to Harald Penrose. In addition to development work on the Wyvern, he has been demonstrating the Westland Sikorsky helicopter.

J. Y.





OFFENSIVE SUPPORT

A Meteor III of No. 222 Squadron breaks away over the "Aunt Sally" Dakota and Lancaster. The pilots of the jet fighters did excellent work with their compactly grouped cannon.

R.A.F. and Naval Aviation Demonstrate Air Weapons

LAST Thursday's programme of the air offensive demonstration for officers attending No. 4 Special Senior Course at the School of Land-Air Warfare, Old Sarum, was almost identical with previous ones in this series. Certain points, however, merit comment. Most significant was an announcement that a version of the de Havilland Vampire is to replace the Hawker Tempest as the standard ground-attack fighter of the R.A.F. This variant will carry rocket projectiles or bombs in addition to its standard armament of four 20 mm. guns and is believed to have wings of reduced span. Secondly—and this is as regrettable as the announcement concerning the Vampire is welcome—an apology was necessary because not a single Meteor IV could be obtained for demonstration; this, after the Commander-in-Chief, Fighter Command, had expressed the hope some months ago that by the end of the year many interceptor squadrons in Great Britain would be armed with this mark of Meteor.

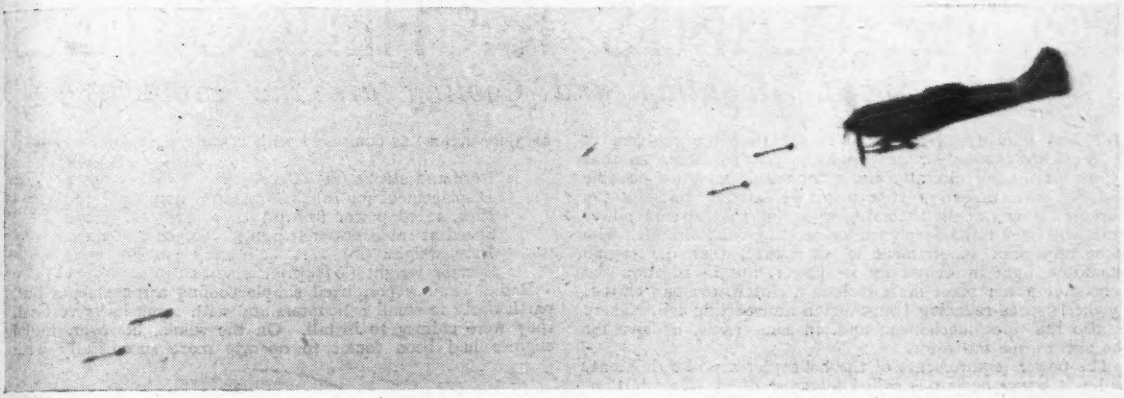
Spectators seemed to be fewer than at previous demonstrations, though all three Services, and the U.S. Army Air Force, were represented. "Students" taking the course for which the demonstration was arranged included the Assistant Chief of Air Staff (Operations), A.V-M. J. D. I. Hardman; A.V-M. C. E. N. Guest, A.O.C., No. 1 Group, Bomber Command; A.V-M. F. L. Hopps, A.O.C., No. 19 Group, Coastal Command; A.V-M. C. B. S. Spackman, S.A.S.O., B.A.F.O. (Germany); A.V-M. F. J. W. Mellersh, A.O.C., No. 21 Group, Flying Training Command; and A.V-M. C. W. Weedon, A.O.C., No. 41 Group, Maintenance Command.

Before the R.A.F. and Naval demonstrations, 25-pounders of the School of Artillery showed how the gunners can assist ground-attack pilots by marking targets with smoke. Yellow and red are the most suitable colours; green is moderately good, but blue smoke has a more restricted application. It was interesting to hear that a new 25-lb flare shell, in red or green, has been developed for night indication. It will burn for 50 seconds and be visible on a clear night to a pilot flying at 6,000 feet, 30 miles off. A new type of air-burst smoke shell, to be visible above trees, was also referred to. Throughout the demonstration, the gunners marked, with a high degree of accuracy, the various targets.

Cannonade

The first air demonstration was a strafing attack by four Spitfire XVIs of No. 63 Squadron, four Meteor IIIs of No. 222 Squadron, a Naval Sea Hornet from No. 801 Squadron, and a C.F.E. Vampire. The armament of all these types (except the Spitfires, which carried two 20 mm. and four 0.303in) was four 20 mm. guns. Due to their high closing speed, the jets could bring their guns to bear for a relatively short time, but they made excellent shooting and their time of fire seemed to be longer than was

This Vampire, using incendiary ammunition, riddled a derelict Lancaster. A new version of the "Vamp." is to be the standard ground-attack fighter of the R.A.F. in replacement of the Tempest.



"Rippling" its 60-lb H.E. rockets is a Centaurus-engined Tempest II of B.A.F.O. Pilots of 135 Wing, from which these Tempests came, practise on a vast German range near their base.

suggested by the commentator. The Sea Hornet and Vampire used a proportion of incendiary ammunition, which ricochetted with spectacular effect.

A pair of Tempest IIs from B.A.F.O. demonstrated admirably the technique and limitations of skip bombing. This method of attack, of course, is normally used in practice only against targets offering a large side elevation, though tunnels have been blocked with success. Other B.A.F.O. Tempests released 250-lb live bombs well short of their target. The bombs were seen to skip hundreds of yards beyond and explode far out on the range. The Tempests releasing them were operating, in conjunction with an air-contact team from the School of Land-Air Warfare, as a "cab rank." Normally, the control of air support is vested in a Group control centre, but in the event of a counter-attack or a break-out, for example, facilities exist for decentralizing control to the level of the Commander directing the battle. The air-contact team comprises an air liaison officer and an R.A.F. controller and is equipped with W.T. and R.T. sets installed in a jeep and trailer. A light armoured vehicle has now been adopted as the "tentacle."

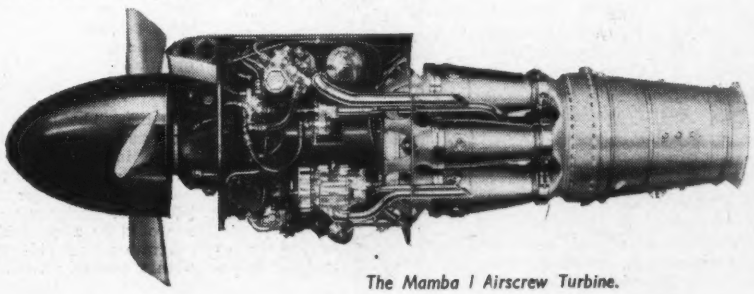
There followed a series of dive R.P. attacks by Tempests of No. 135 Wing, B.A.F.O., each armed with eight R.P.s with 60-lb H.E. heads. Obviously the low cloud proved a great handicap and the first man in failed to draw a bead and went round again. It is essential, of course, for the attacking aircraft to be held steady in the dive for at least two to three seconds in order to eliminate skid. The pilots were persistent, however, and showed, among other things, how their R.P.s could be "rippled." They were followed by four Seafire XVIIs from the School of Naval Air Warfare, which discharged their eight 60-lb R.P.s in salvo, by Spitfire XIVs from C.F.E., and by a single Firefly I which placed its "jackpot" of sixteen 60-pounders very prettily in the target area.

A master bomber and two pathfinders of No. 1 Group, Bomber Command, in Mosquito XVIs, prepared the way for an attack by twelve 1 Group Lincolns which, regrettably, were prevented by cloud from delivering forty-two 1,000-pounders and eighty-four 500-pounders. The Lincolns were to have bombed on green target indicators, allowing a 5-second overshoot. The weather and safety regulations further prohibited the dropping of live 500lb M.C. bombs by B.A.F.O. Mosquitoes of No. 139 Wing. These light bombers did, however, release practice bombs under radar control and, although their error in this instance appeared to be fully 350 yards, the demonstration was convincing. They were at 10,000-12,000 feet, above cloud, and the controlling radar equipment was at Old Sarum, fifteen miles away. Any bomber equipped with V.H.F. can be controlled in this manner, the ground controller following the track of the aircraft by radar and making bombing corrections on his own bomb sight. The equipment used was originally developed for gun laying and has been adapted for R.A.F. use.

No Meteor IV being available, a Fighter Command Vampire—HF-A—approached the enclosure at minimum speed, with undercarriage and air brakes extended, following this with some dashing runs at the other end of the speed scale and a neat roll at low level. A prototype Seafire 47 with contra-rotating airscrew whined past to show its fine lines and a Sea Fury demonstrated briefly that a very wide speed range is one of the almost innumerable virtues of this new Naval fighter, now about to go into service. A Hastings and Valetta were among other types billed to perform but which could not be spared from their development flying.

THE MAMBA FLIES

ON Tuesday, October 14th, the Armstrong Siddeley Mamba airscrew turbine made the first flight of its air test programme. It was installed in the nose of a Lancaster and much of the installation work has been done in conjunction with Air Service Training, Ltd. The Mamba, which delivers a maximum of 1,120 e.s.h.p. has been named for a number of important installations and it should not be many weeks before the Boulton Paul advanced trainer flies with its Mamba power unit. The engine ran for the first time in March, 1946, and was giving its designed rated power in September. It is expected to operate at an unusually low consumption figure for gas turbines. The total weight of the Mamba with airscrew cowling and accessories is 1,000 lb.



The Mamba I Airscrew Turbine.

POWER-PLANTS for HELICOPTERS

Weight, Speed, Mounting and Cooling are the Problems

IT was indicated recently in *Flight* that the problem of providing power for helicopters is not the same as that for fixed-wing aircraft, and although it is quite possible and, in fact, current practice to adapt existing units for the purpose, it is rapidly becoming apparent that special power units will have to be developed for rotating-wing aircraft. The most important requirement is, of course, that the engine should be light in weight for its power, but in addition the helicopter power plant must include a clutch, overrun clutch, flywheel, speed-reducing transmission and cooling fan. There is also the rotor mechanism and, in some cases, a drive for the anti-torque tail rotor.

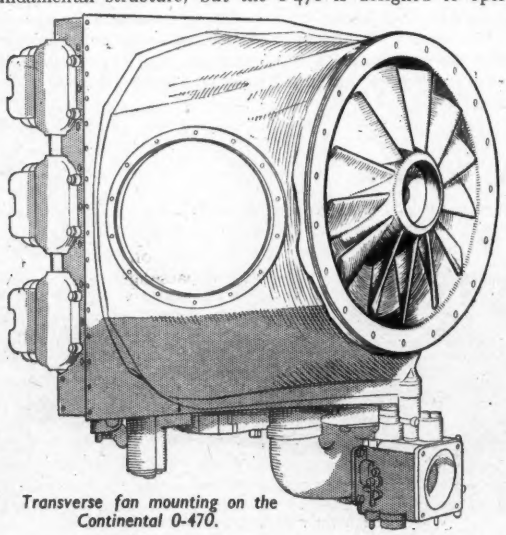
The power requirements of the helicopter are also different, and full power output is called for more often. In addition, although full power may only be required for vertical ascent and descent and for hovering, the fact that the rotor speed is more or less constant for all manœuvres means that the engine is required to run at near to its maximum r.p.m. for a whole range of power outputs.

It has not so far been decided whether any one particular engine layout is more suited than others for helicopters in general, and to date the decision to use radial, opposed or in-line engines, either with crankshaft horizontal or vertical, seems to have been decided by considerations of availability of the engine in the required power class, and space in the helicopter engine bay.

The chief engineer of Continental Motors Corporation of America, Mr. Robert Insley, recently had something to say on his company's experiences with helicopter power plants, and his paper is summarized in the September S.A.E. journal. He points out that there are two ways of achieving lower specific weight from existing engines; power can be increased without increasing weight, or structural weight can be reduced without reducing power output. Regarding the first alternative, increased manifold pressure through supercharging would increase power, but the extra complication was not usually considered worth while. The speed-reduction mechanism between the engine and rotor offered an easier way, and an engine could be redesigned to run at a higher speed and the rotor to have a higher reduction gear ratio. Under the second heading Mr. Insley said that magnesium parts of equal or greater strength than aluminium parts could be produced with a weight-saving of up to one-third. He also quoted the example of a crankcase for a 250 h.p. engine upon which 20 lb could be saved with no sacrifice in strength and little increase in cost.

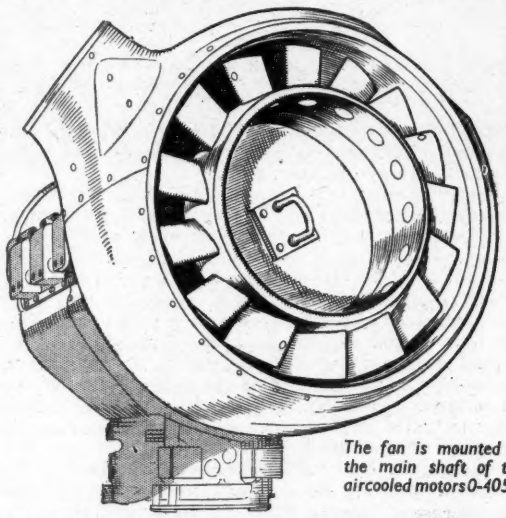
An indication of what could be done by increasing engine speed was indicated by a table of comparative figures for the Continental E-185 flat-six aircraft engine and its counterpart the O-470 helicopter engine. These two units are identical in fundamental structure, but the O-470 is designed to operate at 3,200 r.p.m. as compared with 2,300 r.p.m. for the E-185.

	E-185	O-470
Bore and stroke (in)	5×4	5×4
Displacement (cu in)	472	472
Max. rated power (b.h.p.)	185	270
Speed at rated power (r.p.m.) ..	2,300	3,200
Bare weight (lb)	340	304
Specific weight (lb/h.p.)	1.840	1.111



Transverse fan mounting on the Continental O-470.

Radial engines permitted simple cooling arrangements but, particularly in small helicopters and with crankshafts vertical, they were clumsy to install. On the whole, however, radial engines had been found to operate more successfully with crankshafts vertical than in the conventional horizontal plane. Large helicopters with relatively unrestricted engine space would continue to rely on radial engines, at least until gas turbine power plants were ready for this type of service. Most current small helicopters were powered by opposed engines, a selection probably made on the basis of availability.



The fan is mounted on the main shaft of the aircooled motors O-405-9

Up-ending of opposed engines had caused serious lubrication difficulties. Oil drained down around cylinder barrels and on to rapidly-moving crank throws and connecting rods, and the resultant hot foaming oil caused breathing and sealing problems. Adoption of deep sumps and double oil seals in addition to shielded drainage passages had helped the position.

The engine designer who was successful in adapting existing small engines to helicopter use with only minor external modifications would bring about impressive savings in manufacturing costs. The demand for helicopter engines was so small that manufacturing costs would be high unless the engines were built and used for other purposes also.

Cooling was one of the main problems of helicopter power plants. Rotary-wing aircraft only provided flight-induced cooling draught under conditions at which the engine cooling requirements were lowest. Hovering, the most valuable manœuvre of the helicopter, demanded full engine power but involved zero vehicle velocity, therefore the engine needed to provide its own cooling. Engine-driven fans had been the most popular means of assisting cooling, and the fans might be mounted either directly on the drive shaft of the engine or transversely. The shaft-mounting fan had the virtue of simplicity, but the transverse fan, because of its latitude in design, operating speed, and dimensions, was likely to be more efficient. The location of the fan was often determined by the space available within a particular helicopter, and in future installations, said Mr. Insley, the engine-driven fan might yield its place to the exhaust ejector.

Responsibility for the cooling of an engine rested on the helicopter designer as well as the engine designer. Perhaps it would be a good idea to have the helicopter designer concentrate on providing a healthy environment for the engine, with a properly ventilated compartment to avoid fuel vapour lock and with precautions against re-circulation of air.

The third S.E.200—a monument to the foresight and skill of French designers—in the Old Harbour, Marseilles.

A VIEW OF FRANCE

Part III of the Diary of a Ten-day Tour of Industrial, Scientific and Military Centres

By H. F. KING, M.B.E.

September 27th.

FROM Merignac to Mont de Marsan, in Gascony, was a comfortable half-hour's flying in the willing Dakota. It was a lively morning, and as our coach hummed towards Aire-sur-Adour we glimpsed a sailplane wheeling in that direction. Our objective was the Fouga establishment, best known in England for its Mauboussin aircraft and Castel-Mauboussin gliders.

The Aire plaut is controlled from Béziers and itself is not large, employing only about 300 workpeople. Being engaged in the construction of prototype aircraft and gliders, however, in addition to the repair of aircraft, it was not lacking in interest.

M. André Maroselli, the French Air Minister, by whose courtesy the visits described were made possible.

Under the patient guidance of M. Pierre Mauboussin, the Managing Director, we toured the entire establishment and shall principally concern ourselves here with the new types of aircraft shown to us. One of these—the large C.M. 10 freight - carrying glider — possesses, by virtue of its refined aerodynamic and structural design, qualities denied to the relatively crude British and American gliders built under the stress of war for a specific military purpose. Unlike these rudimentary stalwarts, the C.M.10 should be capable of economical civil operation, though for the present production—at the Sartrouville and Méaulte works of S.N.C.A.N.—is for *l'Armée de l'Air*. The chief test pilot of Fouga told us that, since the date of its initial flight last May, the first C.M.10 has completed preliminary tests and awaits official trials.

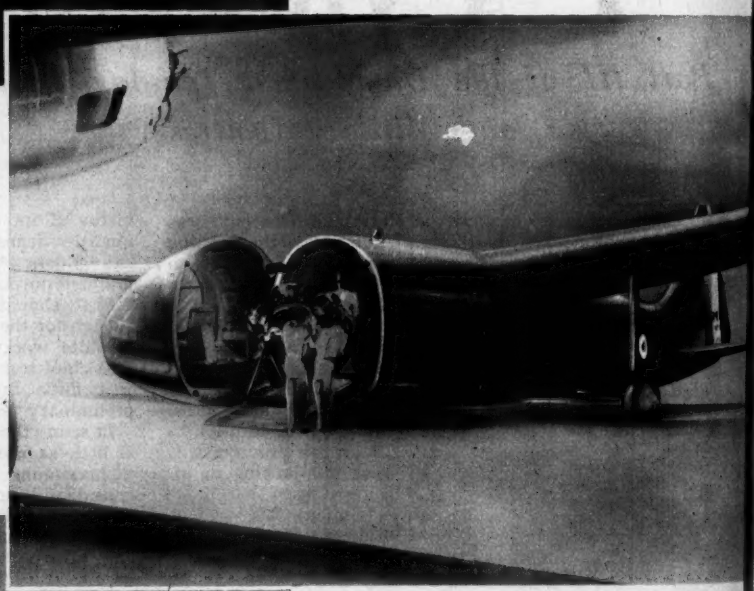
In span, the glider measures over 87ft; empty, it weighs as little as 6,615 lb, and loaded 15,430 lb, the wing loading at maximum weight being 20.5 lb/sq ft. Thus it carries considerably in excess of its own weight. For the present, the construction is composite, the main components being of wood, and certain removable and interchangeable items, e.g., nose portion and flaps, of metal. M. Mauboussin told us frankly that all-metal construction would have been preferred and will, in fact, eventually be adopted. The Fouga works, however, are in a transitional state and are still in need of experience in metal work. Therefore the technical staff are feeling their way gradually.

Entry to the freight compartment of the C.M.10 is by way of a hinged nose, the swinging portion being complete with the pilot's cabin. This, if desired, can be provided with dual control. From the Fouga design office came the following data concerning performance under tow:

Towing Aircraft	*Speed (m.p.h.)*	*Height (ft)*
A.A.C. I (Ju 52)	108	2,950
Halifax	155	4,900
Languedoc	185	6,550

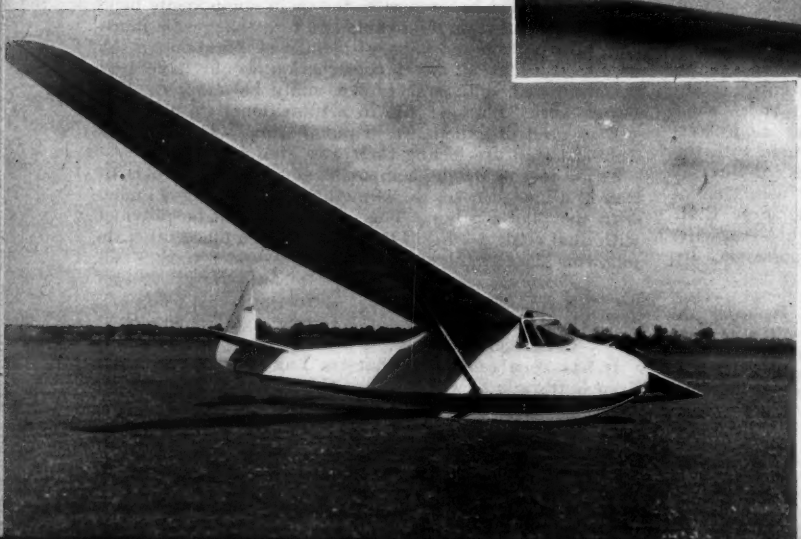
It has been calculated that the Languedoc, a standard French transport, will tow two C.M.10s at 158 m.p.h.

The first prototype of the C.M.10 transport glider on tow. A production order has been placed for the French Air Force. Suitable tugs are the Ju 52, Halifax and S.E.161 Languedoc.



An impression of the C.M.10 in its role as a military freighter. The aerodynamic and structural design of this type are more refined than in mass-produced wartime gliders.

The C.310P is one of a comprehensive range of gliders built by Fouga. A single-seater, it is more advanced type than the C.301S, and is suitable for D-licence tests.



A View of France . . .

With commendable foresight, prompted no doubt, by the Messerschmitt 323, Fouga are building a powered version of the C.M. 10, known as the C.M.100, which will be offered for economical freight and passenger transport. With its retractable undercarriage, the machine is remarkably clean, and, powered with two Renault L2S inverted vee-12 air-cooled engines of only 580 h.p. each, is expected to carry 35 per cent of its total weight of over 16,900 lb and to have a maximum cruising speed above 180 m.p.h. Twenty-one passengers and 660 lb of baggage (or, without passengers, 5,500 lb of freight) will be transported for 300 miles. Moreover, the design will meet I.C.A.O. safety requirements. Various schemes for interior layout—some quite ambitious—are in mind. One prototype of the C.M.100 and one of the C.M. 101 (the two differ only in undercarriage design) have been ordered by the French Air Ministry in addition to two prototypes of the unpowered C.M.10

Another prototype observed in the Fouga shops was the M.300, a 3-4-seater advanced military trainer and liaison machine, for which the specification is at present under revision. No production order is expected. There were, in addition, several Mauboussin two-seater low-wing monoplane trainers undergoing conversion for the Minié engine, and gliders of several types, all of which bear the name "Castel-Mauboussin," in view of the fact that M. Castello is responsible for their design. We were particularly interested in the two-seater C.M.7, two prototypes of which are being made. This beautiful sailplane, with its strength factor of 12, has been designed for cloud flying. Its 59-foot gull-wing is fitted with dive brakes. The C.25S is another two-seater, but is intended for instruction. Apart from the *Jalon*, designed specifically for aerodynamic studies in towed flight, the firm have

produced the C.301S single-seater trainer and the more advanced C.310P. Both types have a strut-braced wing. The Aire factory is further engaged on the overhaul and maintenance of Ansons, Masters, Martinets and Dominies, supplied under the Hartmann agreement. Amenities include an aero club supported mainly by members of the firm, a canteen and shower baths.

Returning to Mont de Marsan by road, we emplaned for Biarritz, where the picturesque clubhouse caught our eye before we drove to our quarters in the luxurious Hotel du Lac, at Hossegor, north of the town.

September 28th.

This morning was spent in consolidating notes and in resting. We greatly regretted our inability to visit the Aero Club des Ailes Basques, at Biarritz, and the Aero Club de Bayonne. Our pleasure was tragically terminated during the afternoon on receiving news that our second navigator had been killed in a flying accident.

September 29th.

With the Dakota's complement reduced by three (two members of the crew, including our hostess, having remained to attend the navigator's funeral), we set out across country for Toulouse. On arrival here we saw aircraft of the French Air Force's transport training unit and, in a hangar, the prototype of an efficient-looking new Breguet long-range reconnaissance bomber for the French Navy, with four Hispano-Suiza liquid-cooled engines and a capacious bomb bay. The real object of our visit to Toulouse, however, was to inspect the O.N.E.R.A. establishments. Unhappily, delays had greatly curtailed the time available, and we were deeply indebted to M. Bielakoff, the director, and M. Dellus, for their clear and concise account of the important work in progress.

The main O.N.E.R.A. building at Toulouse was originally intended as the National Veterinary School. It was explained to us that during the occupation technical investigation was consistently reduced and was concerned mainly with the study of new laboratory apparatus. When the war ended, however, activity was greatly widened and accelerated, particularly in view of the fact that the Paris area lacked modern test installations.

The first test rig we saw was for undercarriage assemblies, the aircraft wheel being pressed, with a force of up to 6 tons, on a rotating drum. This drum can be surfaced with various materials, and it is possible for the wheel assembly to be yawed on to it. Alongside was a newly dug pit for a similar rig, to be capable of applying 100-ton loads. Towering majestically in a nearby building was the fuselage nose of the S.E.2010 transatlantic air liner, rigged for pressurization and static loading tests.

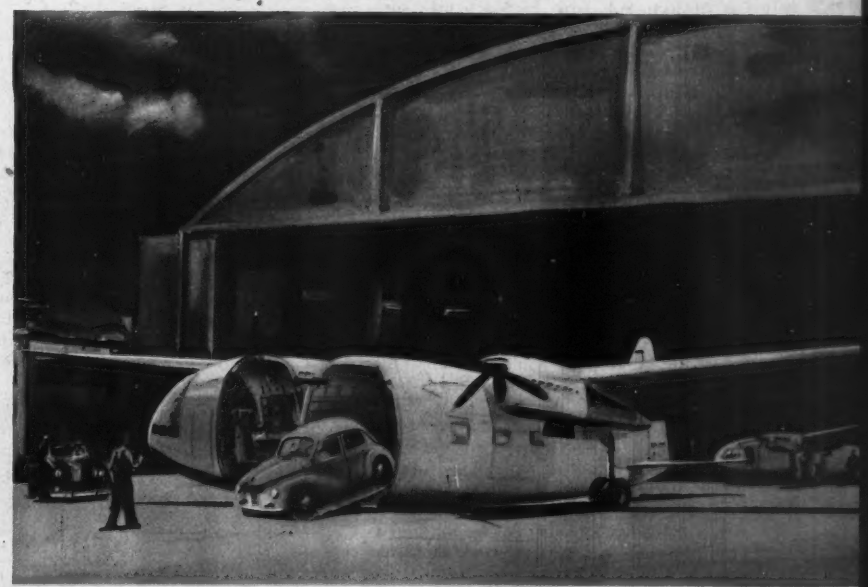
By way of variety, the next item was a far-from-static device, known at O.N.E.R.A. as the Toboggan. From a starting point 40ft high, trolleys, bearing massive wedges, come charging down inclined rails, to impinge on undercarriage wheels at the bottom of the slope.

Hurrying on, we passed tyre-testing and brake-testing rigs (the latter capable of simulating a landing speed of over 90 m.p.h.) vibration tests of radiators, tanks and the like, and an imposing new static test room, for complete fuselages and wings. Here loads will be applied by electrically operated screw jacks.

Having traversed rows of small test machines we now came upon a large low-speed wind tunnel, designed during the war but completed since the Liberation. In its 13.9-foot working section, aircraft models can be tested at wind speeds of up to 135 ft/second. There is also a smaller tunnel, modelled on the "Grande Soufflerie," fed by three fans and capable of similar speeds, and a small one for tests on fuselage, bomb and R.P. models at 650 ft/sec.

As darkness fell, we drove about two kilometres to the site of important new O.N.E.R.A. installations, and, having seen something of the scale and scope of the work being undertaken, felt the deepest admiration for the courage and initiative of our French friends. The largest item is a straight-through tunnel intended specifically for power plant tests. Measuring 560ft overall, and about 26ft in diameter, it will operate at a wind speed of nearly 400ft per sec., power being supplied by motors aggregating 13,500 h.p. There is also to be a closed-circuit sonic tunnel (980ft per sec), with a diameter of over 9½ft, and powered by motors of 15,000 h.p. Another ambitious project, on which work is well under way, is a tank for hydrodynamic tests on models of flying boat hulls. Over 1,300 yards long, it is 18½ft wide and nearly 10ft deep, and will handle models up to 30ft in length.

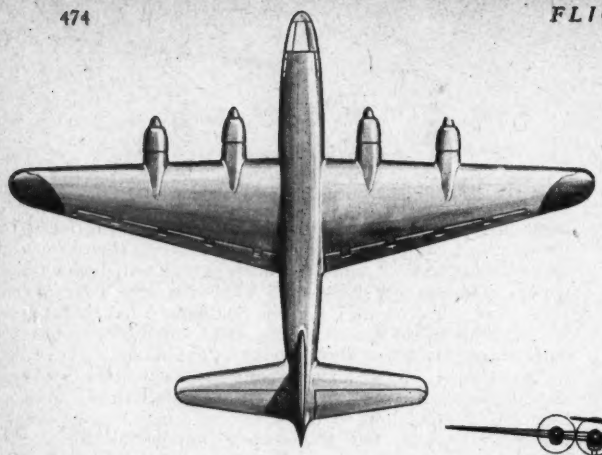
In the sketch above the C.M.100 is seen as a passenger carrier and below as a freighter. The engines are vee-twelve Renaults of 580 h.p. each.

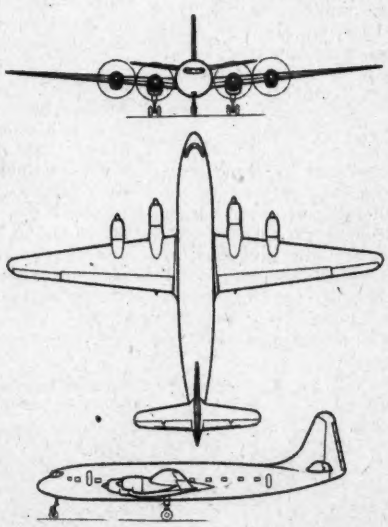


September 30th

After a comfortable night at Toulouse we flew east to Marseilles. Descending towards the busy airfield at Marignane, on the shores of the Etang de Berre, we could feel the first gusts of the Mistral buffeting down the Rhône Valley. Our hosts were the Marignane division of the Société Nationale de Construction Aeronautique du Sud-East (S.N.C.A.S.E., or "Essencaz").

Now engaged on an ambitious programme embracing large landplanes and flying boats, the Marignane works employ a large proportion of a total of 7,500 workers, the remainder of whom are centred in the Paris, Toulouse and Cannes areas. A feature of the factory is a taxi track connecting the huge main assembly hangar, which spans





The plan view of the S.E.1010 (above) shows the Mercier ailerons. On the right is seen the general arrangement of the S.E.2010 transatlantic transport, twenty-five of which are on order, for Air France.

A View of France . . .

more than 390ft, with the airfield and flying-boat slipway. Of the pre-war sheds, only the massive *hangar protégé* remains.

Current activity includes the construction of four S.E.1010 high-altitude survey aircraft, mainplane assemblies for the S.E.2010 transatlantic landplane, and a flying scale model of the S.E.1200 transatlantic flying boat. The mock-up shop housing the wooden flying model of the S.E.1200 was one of our first calls. This beautifully constructed little boat, powered with four Renault six-in-line engines, should fly in December. Lest the word "little" should convey a false impression, it may be mentioned that the span is about 60ft. The full-size aircraft is to be powered, in the first instance, with eight Arsenal 24H engines, though studies for the installation of Clydes or Pythons have been made, the estimated maximum speed of the Python version being 435 m.p.h. The span is to be 200ft and the length 177ft, and 125 passengers will be transported, in *chaises longues*, for 3,750 miles. Thus this great boat will make an interesting comparison with our own SR45 and will, in fact, bear a marked resemblance to it. The planing bottom extends over almost the whole length of the hull, and the wing floats retract into the mainplane tips.

Functionally and technically, the 53,000-lb S.E.1010 is of unusual interest. Being intended specifically for high-altitude photographic survey work in Africa on behalf of the French Geographical Institute, it has very elaborate photographic equipment in a pressurized cabin, and is suitable for operation from relatively small fields. It must be the only large aircraft which carries a spare main wheel and a spare tail-wheel as standard equipment. On the power of four S.N.E.C.M.A. 14 R radials, the take-off run is estimated to be 360 yards. To permit the installation of flaps over as great a portion of the trailing edge as possible, Mercier ailerons, the plan form of which is apparent in our sketch, have been adopted. The S.E.1010 is normally to operate at heights between 26,000 and 33,000ft, and its estimated maximum speed is 350 m.p.h.

One regretted that it was possible to see in the Marignane works only the main (inter-spar) sections of the S.E.2010 wing. The complete aircraft are assembled at Toulouse, and the first test flight should be made early next year. Twenty-five of these aircraft, appreciably larger than the Constellation, have been ordered by Air France. Powered by four Pratt and Whitney Wasp Major 4360 engines, they will weigh 137,000 lb, and measure 160ft span. Depending on range, up to 160 passengers can be carried in the pressurized cabin.

Apart from their constructional work, S.N.C.A.S.E. are converting a number of LeO45 bombers into LeO455 photographic aircraft for the French Air Ministry.

As a climax to a memorable visit, we were privileged to fly in the S.E.200, No. 3 (Nos. 1 and 2 were destroyed by Allied bombing) along the Mediterranean coast as far as Antibes. Having already sampled the luxury of the Latécoère 631, built to meet similar requirements, one found this especially interesting. Again one felt that, having regard to the date of the design, this great aircraft reflects the highest credit on those responsible.

M. Claude Chautemps, our pilot, seemed to cope very ably with the Mistral, though, on the turn into wind before take-off, one wing float and an appreciable amount of its supporting gear were completely submerged, the float slowly reappearing like a midget submarine. After landing, M. Chautemps blandly informed us that he is a landplane pilot by trade.

The evening was passed pleasantly with *l'Armee de l'Air* in their quiet H.Q. town of Aix-en-Provence. We dined in their cheerful little mess.

October 1st.

To-day our schedule read "Lyons-Zenith factory," but this visit was not to be, for we had vowed, with the concurrence of M. Frugier, to be back in Paris by late afternoon. The omission was keenly felt, particularly as we had earlier been obliged to cancel a call at the Morane

General Domino, G.O.C. 2nd Air Region, addresses visiting journalists at the "Meridor" in Paris.

A View of France . . . . .

factory at Ossun. However, we were royally entertained to lunch by the Chamber of Commerce of Lyons, to whom we are indebted for one of our warmest memories of France.

Well before dusk we were back at Le Bourget and in the evening were able to offer a little dinner at the Hotel Claridge to a few of our hosts and friends who had not spared themselves on our behalf.

Mr. Duff Cooper expressed, through Air Vice-Marshal George, his regret that absence from Paris should prevent his accepting our invitation.

Though their squadron at Orleans was hard pressed to meet all its commitments, the crew of our Dakota were fortunate enough to receive permission from their commanding officer (Commandant Mottez) to remain in Paris overnight, and were thus able to attend our party. They made a splendid team of fellows and we had formed personal friendships.

October 2nd

Our trip home to-day was in a youthful-looking Air France DC-3—the first to be equipped with a Decca Navigator. Mr. Jamieson, of Decca, chanced to be a passenger, and we were able to go forward and see the Navigator at work.

So, to the end of our trip, we were to be reminded of the benefits of international collaboration.

American Newsletter

The Martin 2-0-2/Convair 240 Race : Pampered Passengers : Busy Airports : Timing of Speed Records

By "KIBITZER"

IF the following grouse is nothing new, it is such a real one that the more people who talk about it the better. I refer to the tremendous amount of time that is wasted between reporting to the airline office, or terminal, and the time the aircraft wheels leave the ground. I must admit it seems to be worse in Europe than in America, but I have been studying the airline timetables, and some pretty astonishing delays have come to light. (I am referring, of course, to actual schedules, not delays brought about by abnormal circumstances.) On the Atlantic run the London-Heathrow time-lag seems to be one of the worst. Admittedly this is a tough proposition, in view of the distance of this airport from the centre of London. But even when one takes this into consideration, it is really nonsense to ask passengers to report at Victoria an hour and forty-five minutes before the aircraft is due to take off, then keep them hanging about, both at the terminus and at the airport, for considerable periods.

Swissair is another shocking offender. The timetable calls for the passenger to report to the airline office in Geneva at eleven o'clock for a twelve-thirty-five take-off! From my own experience I know that the journey from the centre of Geneva to the airport can't take more than fifteen to twenty minutes and, unless the Swiss Customs and Immigration authorities have suddenly become incredibly inefficient, their total formalities can't take more than another twenty. The net result is that the wretched passenger must hang about, either at the terminal office or at the airport, for some fifty-five minutes, time which might be better employed. When an efficient operator like Swissair permits such a waste of time it is hardly likely to help air travel.

As a general rule one can see absolutely no reason why the airline bus cannot be cut out altogether and the passengers told what time the aircraft goes, and perhaps be given an estimate of the time for Customs, etc.—saying, for instance, "Passengers should report at the airport at least thirty minutes before take-off time in order to complete the necessary formalities"—and then left to fend for themselves. It is a system that is becoming more and more popular over here. After all, the railways and steamship companies don't wet-nurse their ticket-holders to that extent and people have been known to catch Continental trains. If a passenger can't get himself to the airport in time then he shouldn't be travelling alone, anyway!

It is true that, in the case of London, the extreme distance between Victoria and the airports makes such a procedure difficult, but even here much too much time-lag is introduced. Why, for instance, can't some of the formalities be done on the bus going out? The trouble is that when aviation was young, in order to get people to fly we had to hold their hands to an incredible extent. Flying was strange and dangerous, and so far as they were concerned, and because they had never done it before (and weren't too keen on it anyway), they had to be helped in every way. But that is all over now. So for goodness sake let's treat them like intelligent people—give them the facts—expect them to understand them—and then, if they haven't arrived on time, let the aircraft go off without them! Those who are left behind will soon learn, and we shall at least have the satisfaction of wasting our own time in our own way, instead of being in a continuous state of suspended animation at a terminal or airport!

SOME TRAFFIC FIGURES

IN view of the criticisms that have appeared in the Press regarding delays in landing at Heathrow, some of the figures for the busiest airports in the States are interesting. Taking May, 1947, as a representative month, La Guardia handled 11,528 commercial landings and take-offs, the highest commercial figure in the country. Atlanta, Georgia, however, had not only the greatest number of total operations, 45,508, but looked after the biggest private owner movement anywhere, with 40,992 landings and take-offs for the month. The three busiest airports, Atlanta, Cleveland and Phoenix, all handled over 40,000 aircraft each, which is not bad going for thirty-one days.

Other figures covering airports and traffic activity were recently issued by the Civil Aeronautics Administration, and as of August 1st, 1947, the number of airports in operation had increased in one year from 4,326 to 5,337. Of this increase the largest figure was for commercial airfields, which rose from 1,781 to 2,558, while military fields dropped from 820 to 586. The number of scheduled air carrier aircraft in use also increased from 739 to 913. At some of the airports there was a falling-off of business, however. Washington had a drop in passenger departures from 62,766 to 48,840, and only 45,400 arrived as against 57,786 for the previous twelve months. This is particularly interesting as the aircraft arrivals and departures only fell from 9,826 to 9,796, indicating a lower percentage of passengers carried. It should be remembered, however, that during the war Washington was one of the busiest airports in the country, and that its importance as a passenger centre was bound to decrease after V-J day.

In terms of load carried the Civil Aeronautics Board announce that the mail ton-miles flown by the sixteen domestic airlines for June, 1947, increased 10.12 per cent over the same month for 1946, and express ton-miles

American Newsletter . . . . .

showed an increase of 39.85 per cent. Revenue miles, however, were only 1 per cent up, and revenue passenger miles fell by 3.66 per cent for that month compared with 1946. But the domestic airlines do plenty of flying here, whatever their passenger revenue is, and during the first six months of 1947 they logged a total of 159,426,890 miles, which was 93.4 per cent of their scheduled distance.

CONVAIR COMMENT

EVENTS which will have a considerable bearing on the future of the Convair 240 have been taking place these last weeks. For some time there have been stories that "AVCO," the financial wizards that controlled (amongst other enterprises) the entire Convair group (Consolidated-Vultee Aircraft Corporation), wished to give up their purely aviation connections and retain an interest only in the non-aviation sections of this big combine. It is now apparent that they have been successful, for the Convair section is to be taken over by a new financial group headed by Mr. Odlum. (Mr. Odlum is the husband of Miss Jacqueline Cochrane, whose fleeting visits to England, both before and during the war, may still be remembered by some. They certainly will be by anyone who was at Mildenhall prior to the start of the England-Australia race, in which her aircraft was competing. The night arrival of this Gee-Bee racer and the skill of the pilot in landing it in the dark without breaking it was no less astonishing than the reasons given for the apparent delay between Heston and Mildenhall!) But Miss Cochrane has a connection and reputation in the industry here which is certain to influence the development of the new Convair company.

Associated with Mr. Odlum in this venture is Mr. Benny Howard, one of the best known and most able engineer-test pilots in America, who has, for a long time, been with the Douglas company, first as chief test pilot and latterly as technical adviser to Donald Douglas. There is no question that his very great knowledge will be of immediate benefit in the development of the 240, for it is now rumoured that this machine has run into teething troubles, and that the C.A.A. certification is being held up in consequence. What these troubles are has naturally not been told, but they are almost sure to be connected with the fulfilment of the I.C.A.O. single-engine requirements. Centre of gravity limitations have also been mentioned. In any case, it looks rather as though the race between Glenn Martin and Convair is now slightly in favour of the former (some seven Martin 2-0-2s have been delivered to North-West Airlines), but the advent of this new controlling interest at San Diego—most of whom (as opposed to the previous board) are knowledgeable and active aviators of long standing—may bring the 240 up to the front again. Certainly a personal knowledge of Benny Howard's ability makes one convinced that, if the rumours of trouble are, in fact, correct, something will be done about it, and done well and fast.

SPEED RECORD RUMINATIONS

THE Navy speed record of 650.6 m.p.h.—which was at a Mach number of just over .83—has not created the appreciation here that I expected. There was some obviously Army-inspired comment that the P-80 was a standard fighter (which it wasn't) and that a research aircraft was bound to be faster, and that was about all. Knowing the power of the Public Relations Sections of the Services over here, it looks a little as though the Army were quicker off the mark than the Navy in this regard. But I would expect the Navy to try again, for if the new T.G.190 engine is fitted to the D-558, and there are no compressibility troubles above .83, there will be at least another 1,000 lb thrust available with this power unit, and probably nearer 2,000 lb with water injection. The timing of such records is, of course, presenting an ever-increasing problem. With the course at its present length, the difference in time between one record and the next is fantastically small, and the greatest accuracy is required. It seems likely that in the future the F.A.I. will not only permit an increase in the length of the course but may put up the height at which it can be flown as well.

Curiously enough, all the pilots who have done speed records, and to whom I have spoken, prefer the lower altitude (unless they can get up really high, when the timing presents great difficulties). Their argument is that if anything happens under 5,000 or 8,000ft you've probably "had it" anyway—and the only way to fly an accurate level course is to be able to fly close to the ground. This being so, it may be some years yet before this record is done at high altitudes—and even then it may be found advisable to keep a low-altitude record as well and divide the High Speed Record proper into low- and high-altitude sections. Timing the latter should keep the radar boys busy!

SKYWAY FINANCES

A FINANCIAL interest in Skyways has been acquired by British Electric Traction, one of the principal companies in the Drayton group, headed by Mr. H. C. Drayton. Brig. S. K. Thorburn has been appointed vice-chairman to represent the group on the Skyways Board of Directors, but Brig. Critchley remains as the Chairman and Capt. Ashley as the managing director. British Electric Traction has had experience in civil aviation through interests it once held in air transport before the nationalization of scheduled airlines. The company is particularly interested in the possibilities of the helicopter for commercial operation and is at present examining the position with particular reference to the Westland Sikorski 51 and Bristol 171.

NOTES FROM ITALY

LAST week we published a picture of Dr. A. P. Thurston, a former vice-president of the model committee of the F.A.I., who has recently returned from a visit to Italy. He reports that aeronautics in that country are slowly coming back to life. Dr. Thurston adds that at Urbe airfield outside Rome he counted 7 Piper Cubs, 1 Breda (with Fiat engine), 1 Ajax amphibian being used for air charter and taxi work, and 1 Lombardi 3, while at the airfield at Milan they have 8 American Argus, 6 Lombardi 5s, 4 Piper Cubs and 2 Aerovans. There is a prototype Breda 308 under construction and six airline companies are flying an assortment of Dakotas, S.M. 82, 84 and 95s and various converted bombers and bomber transports such as Fiat G.12s. Dr. Thurston's impression was that although there is an acute shortage of both petrol and aircraft there is great enthusiasm in Italy for private and model flying.

Signor Guido Mattioli, editor of the Italian aviation magazine *L'Aviazione*, and one of the chief instigators of the Italian Air Rally being held at Centocelli airport on Sunday, October 26th (announced in *Flight*, October 16th), has given some details of events taking place on that day. The programme includes an exhibition of gliders; new Italian light aircraft such as the Macchi 308, Lombardi 5, Ambrosini Grifo, Caproni Cator and motor glider Mantelli 8; a display of British, American and Italian military aircraft, parachute descents and an aero-model competition. A bust of Wilbur Wright presented by Gianni Caproni to commemorate all pioneers of aviation is to be unveiled during the afternoon.

FORTHCOMING EVENTS

Oct. 23rd.—Royal Aeronautical Society: "The Problem of High Temperature Alloys for Gas Turbines." Sir William T. Griffiths, D.Sc., F.R.I.C., F.Inst.P., F.I.M.

Oct. 25th.—Helicopter Association of Great Britain: "Some Work with Rotating Wing Aircraft." O. L. L. Fitzwilliams, B.A.

Oct. 30th.—Royal Aeronautical Society: Third British Commonwealth and Empire Lecture. James Bain.

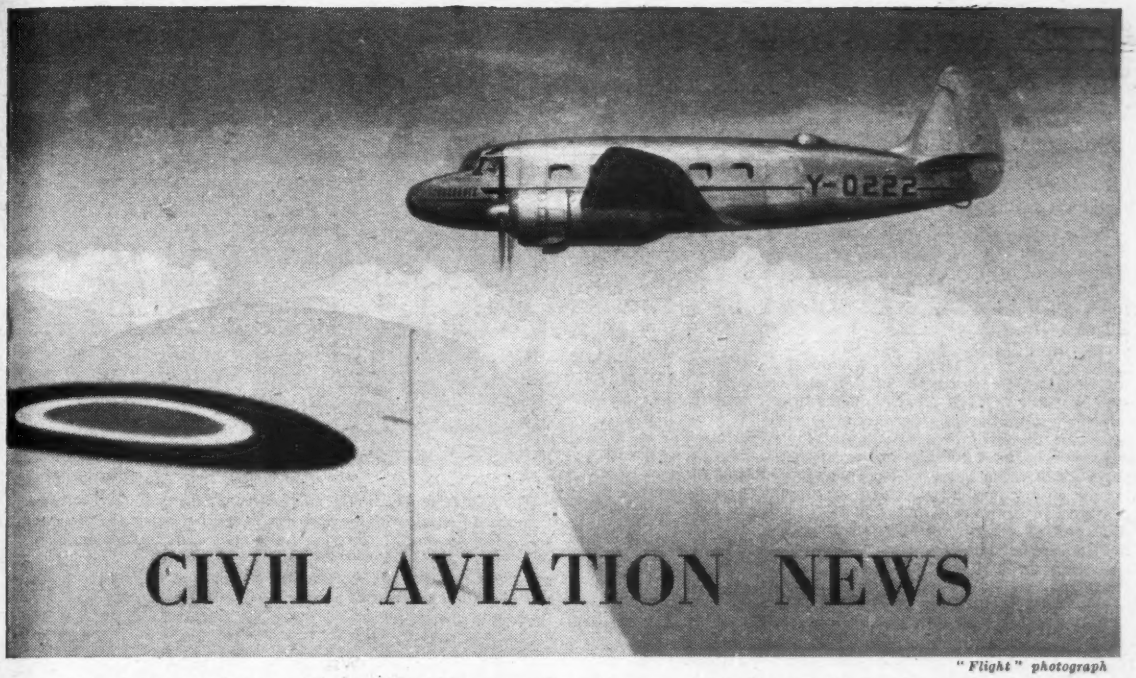
Nov. 1st.—Society of Licensed Aircraft Engineers: "Aircraft Pneumatics." H. R. Haerle.

Nov. 4th.—R.Ae.S. (Graduate and Student). "Maintenance Difficulties in the Field." M. J. Kemper, M.B.E., A.R.Ae.S.

Nov. 4th.—Herts and Essex Aero Club: Annual dance, Park Lane Hotel.

Nov. 6th.—Royal Aeronautical Society. "Some Recent Developments in the Landing Gear Field." Capt. R. Lucien, A.F.R.Ae.S.

Nov. 29th.—Pathfinder Ball, the Dorchester Hotel, Park Lane, London, 8 p.m.-1 a.m.



CIVIL AVIATION NEWS

"*Flight*" photograph

TAPPING WORLD MARKETS: Cunliffe-Owen Limited have sent a Concordia on an extensive demonstration tour through Europe. The type is powered by two Alvis Leonides engines, has a span of 46ft 8in, a length of 44ft 10in and a normal gross weight of 12,500lb. With accommodation for ten passengers, the cruising speed is 194 m.p.h. at 9,500ft.

Runway Improvements at Prestwick and Turnhouse : FIDO Diversion Airfield : American Pilots' Strike : Log of the Bermuda Sky Queen

CONCORDIA EXPORT TOUR

THE Concordia, happily named as it is, no longer requires any introduction to operators or those interested in transport aircraft, but people are still asking themselves a number of questions about it. For example, who in this country is to use Concordias? What chances has it on the export market? What existing aircraft should it replace? and, perhaps more pertinently, how has it flown and reached the production stage in these days without official backing? The answers to some of these questions were given and discussed at a luncheon at Grosvenor House on October 14th, when the Concordia was given a send-off on an extensive export demonstration tour. Testing has been completed and confirmation that a C. of A. had been granted was received before it's departure last Thursday.

Recalling the considerations which led to the design and production of the Concordia, which was fully described in *Flight* of May 29th, it should be borne in mind that this 10-14-passenger tributory transport has been introduced to provide an efficient, modern and economical type from the point of view of the commercial operator—a machine which can be operated at a profit. Its present cost price of £22,000 may later be reduced, but is, in any case, not unreasonable by present standards, while its estimated direct operating costs of 1¾d per passenger mile compares favourably with those of possible competitors. In fact, the Concordia is practically in a class of its own; even the great manufacturing capacity of the United States does not, at present, offer an alternative, nor is there available elsewhere a comparable machine of the performance or capacity at the same initial cost.

To date, there are no firm orders placed in this country, although there are a number of serious enquiries, so the two aircraft which are to be supplied to B.E.A. form the only home support of this Cunliffe-Owen venture. The lack of orders from charter companies in this country is a reflection of conditions and times rather than the qualities of the aircraft or the desires of the operators. The present uncertainties and travel restriction are bound to deter potential customers. B.E.A. have made no detailed statement about their requirements, but they have indicated that they want a minimum capacity of 14 seats on the shorter routes.

Two major problems confronting operators and manufacturers at the present time are I.C.A.O. requirements and airfield limitations. Such old faithfuls as the Rapides must be replaced in the near future and, in fact, it is doubtful whether the seriousness of the predicament which we must face as a result of I.C.A.O. requirements is fully realized.

Only two twin-engined aircraft exist which are capable of meeting the single-engine requirement; they are the Ambassador and the Convair 240. Even so the latter is a borderline case. It has been calculated that the Concordia would need two 850 h.p. engines to satisfy I.C.A.O. standards, and the only alternative to the twin with uneconomically large power units is the three- or four-engine type, for which again the initial cost and the maintenance must be high by comparison with a twin of comparable performance and capacity.

It remains to be seen what the Concordia demonstration tour will produce in the way of export orders. Mr. D. H. Cunliffe-Owen indicated that the first production aircraft should be ready in December, and that a number of European operators had expressed their interest in the Concordia but wished to try it out for themselves before taking further action. Prudently, the first tour is to be made reasonably near home, and the route will probably be to Brussels, the Scandinavian countries, Rome, North Africa and home *via* Spain. After inspection the machine may then visit India and perhaps Australia. These two Dominions are regarded as the best potential customers, but the possibility of sales in South America, particularly for ambulance versions, was not being overlooked. "Cunliffe-Owen are prepared to take the Concordia and demonstrate it to any good customer."

The Concordia is probably unique among such types in this country in having been tooled-up and produced entirely as a private venture, and it will be agreed that it is most refreshing to find a company with sufficient faith to put its hand in its pocket and to design and produce such a machine without asking official backing for so much as a penny of the cost. As a very rough estimate, the development costs have been in the region of half a million pounds, but Mr. Cunliffe-Owen has said that his company is "not sorry to have gone into it" and is confident of seeing its money back. However, he added that to do it again now would mean "tying up too much money for too long." To see a reasonable profit it

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would seem to be necessary to sell between 50 to 60 aircraft.

The aircraft has good, modern lines and a pair of well-thought-of Alvis power units Reliable and critical observers assess its flying qualities highly, and there is little doubt that it will commend itself to many foreign operators. Good luck and good hunting to the Concordia on its export demonstration tour.

FIDO FOR CIVIL USE

AT a meeting of the National Civil Aviation Consultative Council, Mr. G. S. Lindgren, Parliamentary Secretary to the Ministry of Civil Aviation, announced that Fido would be available day and night at the R.A.F. Station, Manston, near Ramsgate. The Hades type installation at this airfield forms a lane of burners along 2,000 yards of the 3,000 yards concrete runway, on QDM 292 deg. Civil aircraft flying to London Airport or Northolt with insufficient petrol to reach a fog-free airfield elsewhere, may now be diverted to Manston. The Ministry of Civil Aviation are working on the Fido installation at Blackbushe, near Camberley, and it is probable that although this will be used mainly for experimental work, it may also be used for diversion purposes. The announcement suggests that the Ministry have decided—in our opinion wisely—that Fido must be regarded as an emergency measure for the landing of aircraft only when other means have failed and diversion to a clear airfield is impossible, and that it should not be considered as a normal aid to bad weather flying at the main airports.

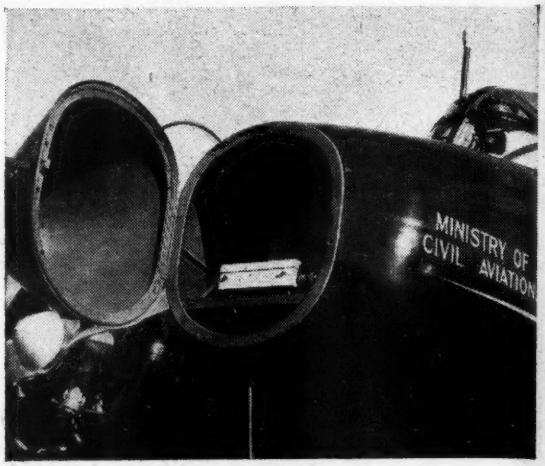
CONSULS FOR "INSTRUMENT RATING"

THE Ministry of Civil Aviation have ordered 5 Consuls to be specially equipped with approach aids for checking transport pilots in instrument flying and blind approach ability. Such aircraft will be necessary for the Ministry to implement the new regulations for commercial pilots' licences. They are equipped with dual control, and an instrument panel similar to that of the Oxford. Screens have been arranged with amber sections to allow checking to be completed by day, using the two-stage amber system. A Standard Beam Approach receiver is mounted in the nose luggage-locker with the whip aerial below it. The aircraft also carry a Standard STR.9 V.H.F. set, and a Murphy Type 24 receiver for use with Consol transmissions. It is understood that since the introduction of the Consul early last year 150 of them have been delivered to all parts of the world.

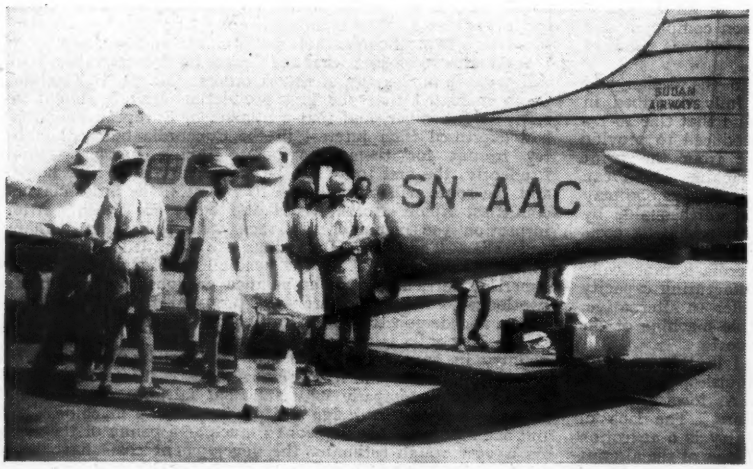
PRESTWICK AIRPORT

AIR COMMODORE J. G. MURRAY, Controller of the Scottish Division in the Ministry of Civil Aviation and Chairman of the Scottish Aerodromes Board, made a statement following a meeting of the Board on October 9th. It is understood that members had studied information in the possession of Scottish Aviation, Ltd., on the condition of the runways at Prestwick and their foundations. The information is said to have been rather theoretical, and referred chiefly to the subsoil on which the runways were built. The Ministry's information, however, was based upon the results of practical tests on the runways by experts to ascertain the breaking strengths. The runways had, in fact, been broken at certain places with special apparatus, and the Board considered that they needed strengthening. The Air Commodore pointed out that the Ministry of Civil Aviation were responsible for maintaining runways, and it was the Ministry which would be blamed if they proved inadequate for the traffic.

Strengthening of the runways will involve the work of superimposing a 3-inch layer of tar macadam on the present concrete runways and taxi tracks. Work will commence in the early spring of next year and will be completed by the autumn, during which time the airport will remain in operation, but it may be necessary to divert traffic on occasions to the Admiralty airfield at Heathfield, one mile away. This decision has been taken in view of the operation of Stratocruisers by several transatlantic airlines, and it is understood that it will cost about £200,000. The Controller said that development at Turnhouse had also been discussed, and it had been decided to extend the N.W.-S.E. runway at the S.E. end to 2,000 yards. Construction of another runway is being considered in the East-West direction to meet the extended runway at the S.E. end. It was, however, unlikely that work at Turnhouse would be started this winter.



FOR AIRCREW TESTING : One of the Ministry of Civil Aviation Airspeed Consuls with the nose door opened showing the Standard Beam Approach receiver, and also the associated whip aerial.



SUDANESE REGISTRATION : The D.H. Dove SN-AAC at Khartoum airport on September 22nd, on the first service by Sudan Airways from Port Sudan and Atbara. This airline, of course, is run on a management basis by Airwork. The registration is one of the first in the new Sudanese series.

A.O.A. STRIKE

THE strike of aircraft captains in American Overseas Airlines which started on September 30th, was, at the time of going to Press, still in progress. The fleet of 17 DC-4 and Constellation aircraft are grounded on both sides of the Atlantic, two are in London, two in Copenhagen, one in Frankfurt, one in Stockholm and the remainder are in the United States. A.O.A. are endeavouring to book passages for passengers by other airlines and on transatlantic boats. Negotiations are understood to have been in progress for some time between the Company and the Airline Pilots' Association and of the various points at issue all, with the exception of the terms of hours of service, were settled, including the question of salary. The dispute arose through the pilots' objection to the Company's policy of maintaining a stand-by crew in readiness for flying should there be any reason for the normal crew not taking over.

The salary scale for A.O.A. pilots provides for a captain flying 85 hours a month and having eight years' seniority, a monthly salary of 1,473.06 dollars if flying a Stratocruiser, or 1,307.74 dollars

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for flying a Constellation. A first-year Captain on a Constellation would receive 1,022.07 dollars a month, and a four-year Captain flying 85 hours a month would receive 1,241.07 dollars a month.

The cost to American Overseas Airlines is estimated to be over $100,000 a week. Although it is the desire of the company to hold together the basic organization, it has been found necessary to dismiss some employees, but others have been suspended on the understanding that they will be reinstated when the strike ends. A.O.A. have offered for lease on a short-term basis their transatlantic fleet of Skymasters and Constellations to 14 international airlines. It is understood that the company is willing to arbitrate the pilots' contracts only after a return to flying.

B.E.A'S FIRST YEAR

OPERATING statistics for August published recently by B.E.A. show a steady increase in the volume of traffic, the single exception being in the amount of mail carried. Comparative figures for July and August, and also figures for the year ended July 31st, 1947, are given below:

	July	*August*	*Total for year ended July 31st*
Passengers carried	69,602	77,787	269,678
Freight carried (lb)	201,600	435,600	2,670,800
Mail carried (lb)	239,800	231,000	2,239,600
Passenger miles flown	14,601,824	15,680,515	73,689,920
Aircraft miles flown	1,288,843	1,443,419	7,399,206
No. of flights made	10,546	11,050	46,217
Route mileage ..	16,548	17,640	—

In August, 1946, the B.E.A. fleet consisted of 21 Dakotas and two Vikings. Personnel numbered 3,000, services covered 7,311 route miles, and 678 services were completed during that first month. By the last month of the first year, July, 1947, the fleet had increased and changed to 26 Vikings, 24 Dakotas, of which four were freighters, 45 Rapides, and nine Ju.52s. Personnel had also increased to 7,521, route miles to 16,548, and during the month 9,989 services were completed.

IRISH AIRLINES' NEW OFFICE

ON October 14th a new London headquarters and enquiry office for Irish Airlines was opened at 221, Regent Street. Mr. John Leydon, chairman of Irish Airlines, Major-General Michael Hogan, assistant general manager, and Mr. John Dulanty, Irish High Commissioner in London, were present at the opening ceremony.

Aer Lingus has in operation ten Dakotas and seven Vikings on services from Dublin to London and many provincial towns in the U.K., and also to Paris. Constellations will soon be introduced on the London service, and also from Dublin to Stockholm, Rome and Lisbon. A maintenance contract has been concluded with Lockheeds, who will take care of line maintenance at Shannon, while major overhaul work will be carried out at the Lockheed base, MacArthur Field.

CHANGES IN INTERNAL FARES

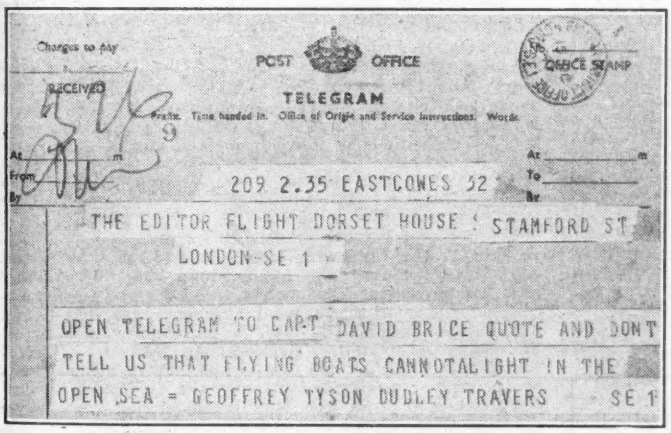
B.E.A. fares on certain internal routes will show an average increase of 15 per cent with effect from November 2nd. The increase reflects mounting operational costs, but on certain services there will be a reduction in fares. Thus the single fare from London to Manchester will be reduced from £4 5s to £4 1s; from Tiree to Stornoway from £4 to £3 9s. The single fare from London to Belfast, however, shows an increase of 6s to £8 6s; from Glasgow to Belfast there is an increase of 9s to £2 19s. The Channel Island rates are not affected.

These new rates have been adjusted to meet the differing cost of varying routes, and in general are less per passenger mile than the existing European fares which are fixed within the I.A.T.A. framework. The reduction on monthly return fares, also operative from November 2nd, will be 15 per cent on the sum total of two single fares, as against 10 per cent prior to this date.

PROVING DC-4M FLIGHT

MR. C. D. HOWE, Minister for Reconstruction and Supply in Canada, and Mr. H. J. Symington, president of Trans-Canada Airlines, recently flew on the first transcontinental proving flight in the DC-4M Mk. II. This pressurized version of the North Star will soon replace the Mk. Is on the trans-atlantic route, and the latter will then be returned to the R.C.A.F. At the conclusion of the flight the following telegram was received by Rolls-Royce: "Arrived Montreal last night after excellent return trip on T.C.A. 201 M.2 aircraft. Howe and Symington delighted with performance of aircraft and engine throughout trip. Record broken on return flight non-stop Vancouver to Montreal 2,345 miles in 6 hours 52 minutes."

Pressurization will permit operations at altitudes suitable to the Merlin, which develops 1,340 b.h.p. at 20,000ft. T.C.A. fly 14 transatlantic schedules a week with six North Stars.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THE EDITOR FLIGHT DORSET HOUSE STAMFORD ST

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OPEN TELEGRAM TO CAPT DAVID BRICE QUOTE AND DONT TELL US THAT FLYING BOATS CANNOTALIGHT IN THE OPEN SEA = GEOFFREY TYSON DUDLEY TRAVERS SE 1

COMMENT UNNECESSARY: Facsimile of a telegram received by "Flight" last week referring of course to the recent forced alighting in the Atlantic.

IMPROVED RAPIDE PERFORMANCE

THE de Havilland manually-variable-pitch airscrew, already type-approved on an Aerovan, is to be tested for approval on the D.H. Rapide. A useful improvement in performance is expected, and the extra weight will be no more than 20 lb. The take-off run will be reduced by 16 per cent to 450 yards, the maximum cruising speed will be improved by 15 per cent to 141 m.p.h., and the useful single-engine ceiling will be 2,750ft. There will also be either improved fuel economy and range through higher cruising speeds for given throttle settings, or reduced engine wear through slower running for a given cruising speed. The new installation will be of value to the many operators of D.H. Rapides, and the conversion is neither difficult nor expensive.

THE FLYING-BOAT INCIDENT

THE *Bermuda Sky Queen* owned by American International Airlines left Foynes at 1.54 a.m. on October 13th for Gander. After running into head winds the Captain decided to alight on the sea near an American weather ship. The sequence of events has been logged by Reuter's and is reproduced below. A telegram from Geoffrey Tyson and Dudley Travers is also reproduced on this page.

8.16 a.m.—"XXX"—highest priority air SOS—from the aircraft when it was still 600 miles from Gander saying "I have only 2.75 hours' fuel left and am returning to weather ship for landing at sea, due to severe head wind."

11.30 a.m.—Flying-boat alighted in rough sea three miles west of weather ship, *Bibb*.

1.35 p.m.—British Air Ministry reported that aircraft had taxied two miles to weather ship.

1.40 p.m.—Weather ship radios: "Flying-boat afloat in rough sea. Passengers still on board."

2.15 p.m.—Second weather ship, *Duane*, 600 miles south-west of flying-boat, ordered to change course, and double speed to reach the scene in 30 hours.

2.40 p.m.—Passengers awaiting transfer to weather ship.

4.11 p.m.—Message to Gander said flying-boat could only "Stand another hour," passengers still on board.

5.30 p.m.—Weather ship reports flying-boat still afloat with passengers aboard.

6.12 p.m.—Cunard officials in New York say that the *Queen Mary* should be somewhere near the scene.

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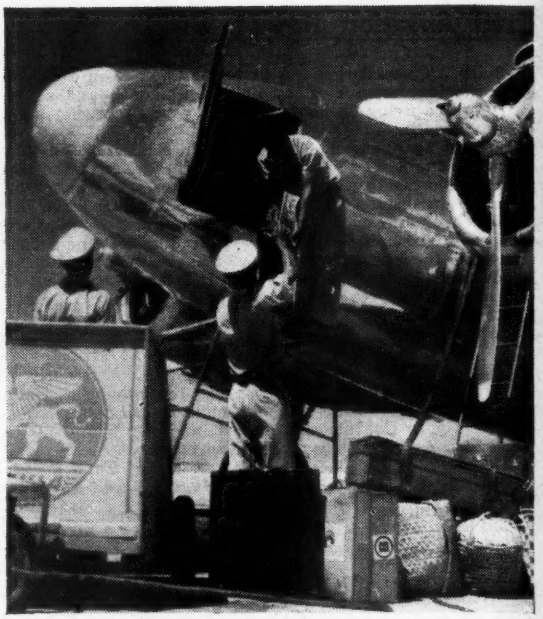
6.47 p.m.—Rescue operations reported "difficult."
8.20 p.m.—Two Flying Fortresses from Newfoundland bases, equipped with life-rafts, circled over flying-boat while some passengers were transferred to weather ship.
9.0 p.m.—Ten people, including three children, rescued.
9.48 p.m.—Winds of gale force reported. Rescue operations continue with boat and raft. Passengers prostrated by sea-sickness.
10.25 p.m.—24 persons reported removed from flying-boat.
11.29 p.m.—New York reports 34 people rescued.
2.12 a.m.—Canadian Air Traffic Control officials report 48 people rescued.
3.11 a.m.—Rescue operations reported so hazardous that weather ship's Captain calls for volunteers.
3.37 a.m.—Rescue operations discontinued owing to darkness.
4.14 a.m.—Gander reports 18 people still aboard flying-boat.
12.16 p.m.—U.S. Coastguards reported that all 69 carried by the flying-boat had been rescued and were aboard the weather ship.
12.27 p.m.—Captain Cronk of the weather ship *Bibb* advised U.S. Coastguard Headquarters that he had recommended that the flying-boat be destroyed.

CULLIFORD AIRLINES

AS mentioned in *Flight* dated October 9, Culliford Airlines have now taken delivery of a Gemini and an Aerovan from Automobile and Aircraft Services, Ltd. The company intend to build up their fleet entirely with Miles Aircraft and expect to receive another Aerovan next February and a Merchantman in 1949. They have not yet received these aircraft, as was previously announced. It is their intention to operate in close liaison with the steamship company Culliford and Clark, whose main interests are in the routes to Iceland, the Faroes and the Bahamas. The Charter Company is based at Squire's Gate, Blackpool, from where passenger and freight charter flights will be undertaken.



WEST INDIAN OPERATIONS: Loading a British West Indian Airways aircraft at Piarco airport, Trinidad. As announced in "Flight" last week, B.S.A.A. have purchased the airline and intend to operate temporarily through a subsidiary company, British International Airlines Ltd., to which Mr. A. D. S. Murray has recently been appointed general manager. The present staff of B.W.I.A. will continue in the normal way.

FROM THE CLUBS

A NEW club, the Hereford Aero Club, has been formed this month to operate from the recently opened Hereford Airport (see *Flight*, Sept. 25th). Until a Clubhouse can be provided on the airfield the Club will have its H.Q. at the Tudor Café, Hereford. This will shortly be available on all days except Mondays from 6.45 p.m. till 11.30 p.m. and all day on Sundays. It will be run on the lines of an R.A.F. mess with a bar, dining-room, and lounge, and it is intended to construct a replica of a flying-control room in which members can have instruction in navigation and other subjects while studying for their "A" certificates.

At the moment three private owners have Austers at the airfield, and the Club will shortly have four Austers and one Tiger of its own. Flying and non-flying members pay £3 3s annual subscription and £2 2s entrance fee; temporary members £2 2s entrance fee and £1 1s per two months; and members serving with H.M. Forces pay £2 2s annual subscription and £2 2s entrance fee. When two or more persons from the same household join, the second and subsequent subscriptions are reduced by 33⅓ per cent.

* * *

The first post-war ball of the London Aeroplane Club is to be held at the Dorchester Hotel, London, W.1, on Saturday, November 1st, from 8 p.m. to 2 a.m. This revival of an established pre-war function promises to be a great success and it is hoped that as many members of the light aircraft movement as possible will take the opportunity to renew old friendships and to enjoy a good evening. Tickets at 25s each will include the buffet and cabaret and may be obtained from the secretary of any flying club, from the Air Centre, Londonderry House, or direct from Miss Chapman, Hon. Treasurer of the Organizing Committee, c/o the de Havilland Aircraft Company, Hatfield, Herts.

* * *

The Portsmouth Aero Club completed nearly 200 hours last month, and six new "A" licences were granted and a number of renewals of pre-war membership have been made. Miss June Humphries who, it will be remembered, gained her free flying training by winning the Women's Junior Air Corps scholarship, has now completed her flying instruction, and is expected to acquire her "A" licence this month. A general meeting of the Club was held on Wednesday, September 24th, when a new committee was elected.

* * *

The Association of British Aero Clubs has recently inaugurated a scheme enabling members of the clubs forming the Association to enjoy reciprocal rights as honorary members of any other club within the Association, during the period of any visit to the neighbourhood of such other club, without payment of additional fees or subscriptions. Flying club members intending to make use of the reciprocal memberships scheme are reminded that they may be required to produce a letter of introduction from their own club and to complete an application for temporary associate membership which will be valid for one month but may be extended under special circumstances. If flying facilities are required, the visiting member may also be asked to produce a log book and certificate of proficiency.

PETROL RATIONS FOR CIVIL AVIATION

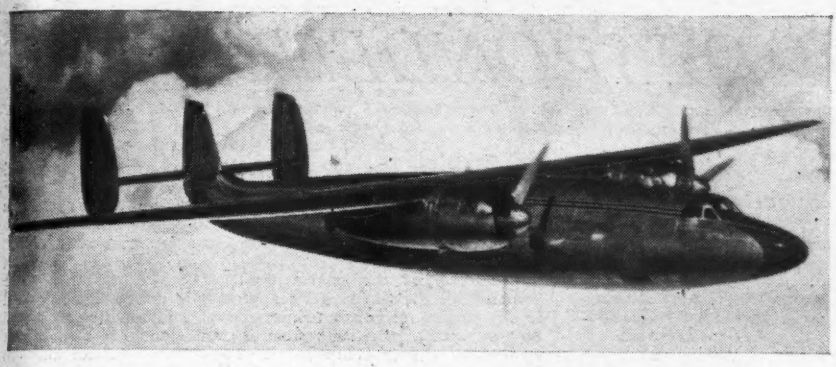
SOME confusion seems to exist regarding the petrol ration obtainable for civil aviation, and to clarify matters we reproduce below a statement issued by the Ministry of Fuel and Power on September 26th. No alteration or relaxation of these regulations has been announced since that date:—

The issue of basic petrol ration coupons for privately owned aircraft will cease with effect from the 1st October, 1947. Petrol obtained against coupons before that date must not be used after the 30th November except for purposes for which a supplementary allowance has been granted.

As from the same date, allowances made for the following purposes will be reduced by 10 per cent:—Privately owned aircraft used for business purposes; Charter and taxi aircraft; Aircraft used by flying schools.

Alternative Fuels.

A number of enquiries have been received regarding the use of alternative fuels (liquid and gaseous). All of these, however, would appear to involve the use, either directly or indirectly, of materials or products which are already in short supply and for which there is an industrial or essential domestic demand. Their use for unessential motoring purposes could not therefore be permitted. The position is being examined and a statement will be issued shortly.



Some Impressions from the Pilot's Viewpoint : Good Basic Characteristics

Flying the Ambassador

THIS Ambassador Progress Report, issued by Airspeed Ltd., is published exactly as received. The writer of it is well known to us, and we are quite certain that it errs on the side of modesty. Although there are minor teething troubles still to be rectified, the flying qualities of this new type are by way of being outstanding, and the moderate tone makes the Report all the more convincing.

THE prototype Airspeed Ambassador has now completed forty hours of test flying, and this might be a suitable moment to pause and summarize a few of the aircraft's salient flying characteristics. This particular moment will be all the more appropriate because, during the last ten hours in the air, opportunities have been given to unbiased and experienced outside observers to assess some of these characteristics for themselves, and all the opinions have been very encouraging.

Indeed, the Ambassador has several features which we have tended to accept as being natural and necessary virtues in any aircraft, but which we knew to be almost unique. It was, perhaps, natural when assessing a prototype on which so much depended, to be over-critical.

Now, with the initial period of test flying behind us and the resultant minor modifications in hand, it is possible to view the Ambassador's characteristics as a complete picture rather than in sections, and to feel a confidence which may previously have been overlaid by our concentration on relatively unimportant faults.

From the point of view of a pilot flying the aircraft for the first time, four features will appear to be outstanding—and all four of them survive both detailed assessment and a study of any test reports which have been made since the first flight. Three of these characteristics will be of vital importance in all-weather airline operation and the fourth will add to the comfort of the passenger.

Most important, perhaps, is the aircraft's stability in all axes, and particularly in pitch. In all flying conditions and at all speeds the fore-and-aft stability is markedly good, without being too positive, and there is no tendency to "hunt" or for the effect to vary with different power settings. Even in very bumpy conditions the elevator control, too, is quite definite, and there is no need for the pilot to "chase" the control when making an approach in rough weather with the flaps down. In particular, the aircraft gives the impression of being a very steady platform at all times, with little wing or fuselage flexing.

In association with this stability is the unusual fact that there is relatively little change of trim between extremes of speed and power. So much so that the aircraft can be held without retrimming, when the engines are opened up to take-off power after a full-flap engine-off approach. Neither the amount of power used nor the speed makes very considerable differences to the trim, though there naturally is a nose-down bias when the flaps are fully lowered. This bias can, if necessary, be held manually—a feature which will form a valuable safety factor in day-to-day operation.

The third important characteristic of the Ambassador is its viceless stall—which is, again, one that applies in all conditions of power and flap-setting. There is no tendency for a wing to drop, and when held at the stall the aircraft simply rocks fore and aft, with a slight buffeting as the nose falls away. Most important of all, full aileron and rudder can be applied without ill-effect when the aircraft is in this stalled condition. The ailerons remain effective, and their use does not tend to stall a wing. Approaches can consequently be made safely at low speed and with no particular need for the use of power.

Finally, even in its unfurnished test-shell form, the Ambassador—thanks largely to the low tip-speeds of the airscrews and to the over-wing exhaust-manifold outlets—is remarkably quiet inside. Conversations can be carried on in more or less normal tones, and the noise-level should be very low indeed when the aircraft has been furnished.

It is early yet to make any useful comments on the Ambassador's asymmetric flying qualities. New rudders, with additional geared-tab area to compensate for the deletion of the original spring tab, are being fitted now that the preliminary handling trials have been completed. These should be considerably lighter in action and will permit the completion of the single-engine flying tests. Already, however, a number of hours of asymmetric flying have been put in at medium powers, and the results have been very satisfactory—especially where the all-important minimum control-speed characteristics are concerned. Some very provisional figures obtained show, in some cases, an improvement on those previously estimated.

A feature of the Ambassador which has a good incidental effect on engine-failure safety is its low span-loading. The aircraft, when flying engines-off, gives an impression of unusual buoyancy. This is borne out in practice by the low rate-of-descent figures recorded in this condition. These figures show an L/D ratio of 17.5 even at a gliding speed as low as 106 m.p.h. (170 km./h.). In practice it simply means that there is nothing critical about the handling qualities in emergency conditions.

From the pilot's point of view the Ambassador's control cabin layout is unusually good, and the "drill" is simplified to the point of demanding only a minimum amount of memory-jogging. The steerable nosewheel and pilot-operated control locks greatly ease the crew's labours while taxying, and the view from the control cabin is well above average transport aircraft standards.

The layout of this cabin is, in fact, such that the pilot is given a valuable impression of being part of the machine. He is not merely someone conducting an aircraft with the aid of a number of ill-disposed controls and from a somewhat indifferent grandstand—an unfortunate impression often gained when flying an aircraft for the first time.

H. A. T.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers not necessarily for publication, must in all cases accompany letters.

"IMMORTAL MEMORY"

The Author Replies to Criticism

REFERRING to the criticism of my recent book which appeared in *Flight* of September 25th, and Mr. Ian Fraser's letter published in the issue of October 2nd. I should perhaps add that to my knowledge I have not had the pleasure of knowing this gentleman but am glad to observe his conviction.

Frankly, I was astounded that so great exception was taken by your reviewer to my remark that eight German wrecks were seen by a friend of mine within a mile of her house. After all, the lady in question ought to know, she was there!

About the Heinkel 113; I went by the combat reports, and checked with *Jane's All the World's Aircraft* (1940). I also took the personal opinion of a fighter pilot who shot one down!

There are admittedly three mistakes in the book which will be corrected in the next edition. The word *types* was inadvertently printed *tpyes* in the Epilogue; the Do 211 should have been Do 217, my writing responsible; and on one page the He 113 is called a bomber although I wrote fighter in the manuscript.

All my eye and Betty Martin; these are surely motes not beams, as I suggest a glance at the book will disclose. "Immortal Memory" is a vitally human story, the deep sincerity of which will fortunately survive captious comment.

E. HOWARD-WILLIAMS.

AIR-CONDITIONING FLYING BOATS

A Question for the Purchaser to Decide

YOUR issue of October 9th contains a letter, signed by Mr. Dennis Powell, about our Sandringham flying boats, now in successful use in South America, and in particular about the high temperature in the cabins when the boats are at moorings. Mr. Powell quotes from the American paper *International Aviation*, which says that the operators have approached an American research company, not an aircraft manufacturing company it is to be noted, to devise a suitable cooling system.

The occurrence of uncomfortably high temperatures in passenger compartments in the tropics is not peculiar to flying boats, nor to aircraft in general, but applies equally to motor cars, trains and indeed houses. It is true, however, that the solution of this problem presents more difficulties in the case of aircraft, as if the necessary refrigeration equipment were carried in flight the payload would be much reduced.

In criticizing us Mr. Powell ignores the fact that manufacturers, however much they may wish to, cannot provide the purchasers of their aircraft with, perhaps costly, extra equipment for the benefit of passengers, unless the purchasers are willing to pay for it.

The problem of cabin temperature control is primarily one for refrigerating engineers, but is also, of course, of great interest to aeronautical engineers. I am happy to say that it has our combined attention.

J. LANKESTER PARKER.
(Sales Director),
Short Bros. (Rochester & Bedford) Ltd.

AUTOMATIC PILOTING

Credit to the Americans

I WOULD like to refer to your editorial of October 2nd headed "Automatic Piloting."

It is unusual for the technical Press or the Ministry to decry achievements by our American friends, although, quite rightly, we often debunk exaggerated claims, usually made by the misinformed daily Press. In this instance, however, I do think that we have not given full credit to the work carried out by the U.S.A.A.F., and have ourselves made somewhat exaggerated claims. Let us give full credit where due.

Ten years ago we had the Queen Bee radio-controlled aircraft, controlled by an operator on the ground, who kept the aircraft in view at all times, certainly very much so during the landing Since then, this country's progress has been small in this particular field. The Americans had electric and electronic automatic pilots early in the war, whereas our first design is just making its appearance (the S.E.P.1 described in the same issue) The precision of the American design has made automatic flight, from take-off to touch-down, over long distances possible with standard ground equipment, and we are yet far from achieving this. To say that we could do it now, let alone ten years ago, is, I submit, bunkum.

Your sentence: "So far as the principle of the Skymaster's autopilot is concerned, it is, in our opinion, outmoded. We do not, in this country, favour radio beams and corridor control with all their weaknesses," surely shows a lack of appreciation of the system used by the Americans. The principle of the Skymaster's autopilot is not necessarily tied in any way to range or corridor control, and could equally well be used with the British system of traffic control. You appear to be mixing your components. Their traffic control may, in your opinion, be outmoded, but a study of the Sperry A-12 and the S.E.P.1, both as described in *Flight*, will show that flights from take-off to landing in zero-zero conditions can only be achieved by supplying the correct radio or radar signals to the A-12, since as yet, the S.E.P.1 does not have altitude control or pitch trim control. The former is essential for maintaining desired flight altitude and during orbiting, the latter absolutely essential during completely automatic approach and landings.

It is for us in this country to appreciate the vast strides made in recent years in the field of automatic flight by the Americans, and to set ourselves the task of putting and keeping this country as far ahead in this most important aspect of operation as we are in such fields as gas turbines.

The Americans would be the first to admit that this flight was experimental, and although the automatic pilot provided all they required, the tying-in of navigational and landing data is some considerable way from finality. Only by working for such an object can we obtain the essential of 100 per cent scheduled flights irrespective of weather conditions.

We cannot afford to be so complacent about this, as we are not yet able to claim to have caught up with America, let alone taken the lead.

"B"-LICENCE PILOT.

[We entirely support "B-Licence Pilot" in his desire to give full credit to the Americans for their recent Atlantic crossing with automatic pilot. As further witness we gave place of honour to a description of machine and crossing in *Flight* of October 9th. Our comments were chiefly concerned with putting the achievement in its true perspective to offset an unfortunate semi-official statement that this country could have made such a flight ten years ago, and certain ill-informed criticisms about the value of the autopilot.—ED.]

DRY ICE AND RAIN-MAKING

Why the Experiment Was Made When it Was

IN reply to Mr. G. J. Bell's letter which you published in the October 2nd issue of *Flight*, I should like to inform your correspondent that his summing-up is erroneous, although his facts in the main are correct.

Airwork, Limited, conducted the experiment of dropping dry ice on cumulus clouds, not as an individual "stunt," but in the course of a series of experiments undertaken by those departments dealing with crop-spraying and related matters.

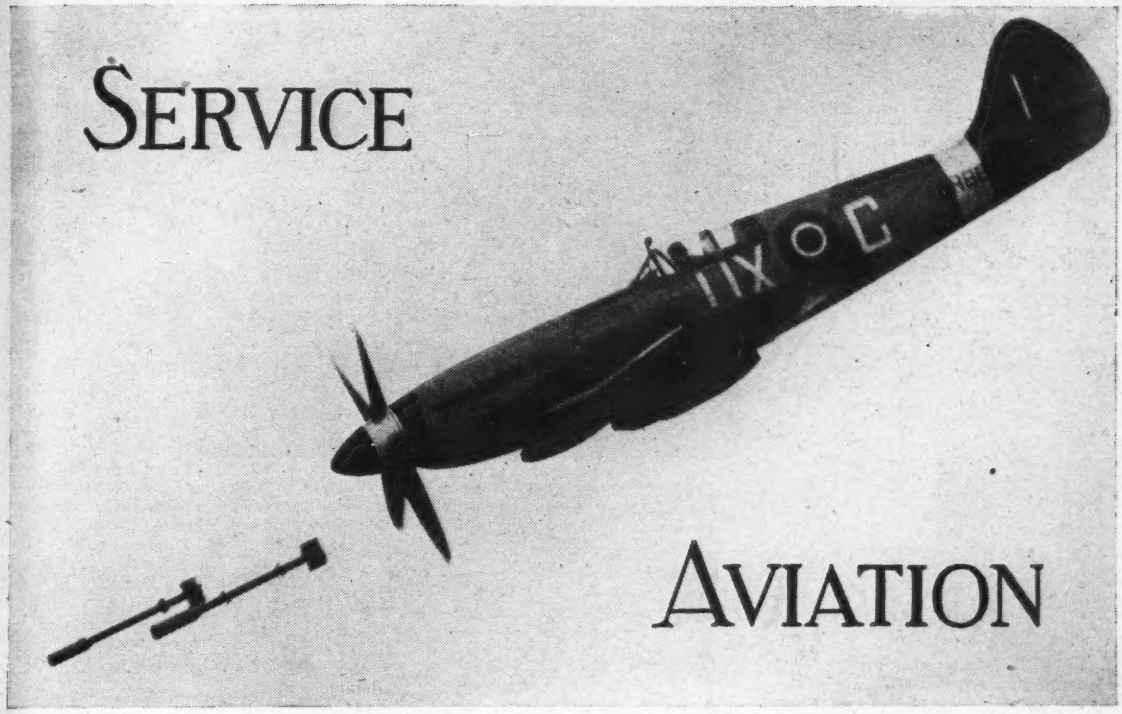
The facts are that both this and other flights, not subjected to publicity, provided those concerned with valuable experience and should be looked upon as a very necessary drill, which has to be followed whether success is achieved immediately or in the future.

Mr. G J. Bell should bear in mind that it is not easy to get the dry ice and that once obtained it cannot be kept indefinitely. Also, unless one courts financial disaster, the specially modified aircraft cannot be kept standing-by indefinitely.

It was a matter of elementary commonsense to seek and obtain guidance from the Meteorological Office. This was, in fact, obtained and the flight, as a result, was scheduled for the following day—Tuesday, September 9th—due to the fact that suitable conditions would possibly be found between Bristol and North Wales. It unfortunately turned out that changed conditions over the Atlantic and Ireland prevented the forecast cloud conditions materializing.

If Mr. G J. Bell bears in mind that arrangements for experiments of this kind have to be prepared in advance—particularly when officials and other persons are invited as witnesses—I think he will revise his judgment and appreciate that an undertaking such as this cannot be called-off at the last moment.

ANN M. FINNIE.
Public Relations Officer, Airwork, Ltd.



DOUBLE TROUBLE: A pair of R.P.s on their way from a Spitfire. An account of R.P., gunnery and bombing demonstrations on Westdown ranges appears in this issue.

R.A.F. Appointments

THE following appointments of senior R.A.F. officers are announced by the Air Ministry:

Air Marshal Sir William Dickson, now Vice-Chief of the Air Staff, is to succeed Air Marshal Sir Charles Medhurst, as A.O.C.-in-C., R.A.F. Mediterranean and Middle East.

Air Marshal Sir James Robb, who has been A.O.C.-in-C., Fighter Command since May, 1945, will replace Sir William Dickson as Vice-Chief of the Air Staff.

A.V-M. Sir William Elliot, formerly Assistant Chief of the Air Staff (Policy) since June, 1946, will be A.O.C.-in-C. Fighter Command, with the acting rank of Air Marshal.

C.A.S.'s Tour

MARSHAL of the Royal Air Force Lord Tedder, Chief of the Air Staff, left Northolt by air on October 16th for a tour of R.A.F. Headquarters and units in the Mediterranean area, the Middle East, East Africa and Rhodesia. The tour will last rather less than four weeks, and Lord Tedder will be visiting as many individual Royal Air Force stations and units as he can in the time. His object is to see for himself the local conditions in which all ranks of the R.A.F. are now living, both on and off duty, and the particular problems they are encountering at all levels.

Benevolent Fund—West Country Tour

AIR VICE-MARSHAL SIR JOHN W. CORDINGLEY, K.C.B., C.B.E., R.A.F. (Retd.) has left on a tour of Wales and the West Country for conferences with area and county representatives of the Fund. He will discuss the future outlook and policy of the Fund in the light of local conditions. His tour includes the following places: Gloucester, Brecon, Tenby, Carmarthen, Pembroke, Swansea, Cardiff, Bristol, Wiveliscombe, Exeter, Torquay, Devonport, Plymouth, Truro, Sherborne, Shaftesbury, Newbury and Reading.

Royal Air Force and Naval Aviation News and Announcements

Education Advisory Committee

THE first meeting of the Education Advisory Committee for the Royal Air Force was held in the Air Council Chamber at the Air Ministry on October 9th, under the chairmanship of Mr. Keith A. Murray, Rector of Lincoln College, Oxford. The Under-Secretary

FAR FROM HOME: A Lincoln in the streets of Buenos Aires—incongruous, but true. The sturdy ambassador is seen on show during Argentina's second aeronautical exhibition. Its purchase by the government of the country has been reported.

Service Aviation . . . .

of State for Air welcomed the members and emphasized the importance and value of the work they had undertaken, and the Air Council appreciated their acceptance of membership of the Committee. The meeting examined the whole structure of the existing educational provision in the R.A.F., preparatory to its task of advising on improvements it may consider desirable.

A Worthy Record

UNDER the title of *The History of War Service of the Pre-war Edinburgh Town Centre R.A.F.V.R.*, a record has now been published, in aid of the Royal Air Force Benevolent Fund, of the R.A.F.V.R. unit which had its headquarters in Edinburgh and did its flying training at Grangemouth. In his preface, the compiler, W/C. W. C. G. Wilson, who was Commandant of the Centre, records that, out of 244 members of the Centre who enlisted as aircrew, no fewer than 116 were killed.

This excellent publication is obtainable, price 2s, from F. J. Lyons, Ltd., 146, Grand Buildings, Trafalgar Square, W.C.2.

Selection Board for P.C.'s

OFFICERS on extended or short-service commissions and regular airmen in ground branches who are recommended for P.C.s will in future be selected by the Selecton Board, Ramridge House, Weyhill, Andover, Hants. The president is A. Cdr. H. M. Massey, D.S.O., M.C. The first selections under the new procedure will, it is hoped, be published in January; subsequently, lists will be promulgated half-yearly in April and October.

Airmen must be at least 25 years of age before they can be recommended, and normally only Group A tradesmen, with an upper age limit of 30, will be considered for commissions in the Technical Branch.

Operation "Seahawk"

THE three Sunderlands of No. 205 Squadron have returned to Ceylon after completing, under the name Operation "Seahawk," a ten-thousand-mile training flight to South Africa. Air Commodore A. R. Wardle, A.O.C. Ceylon, who led the mission, spoke highly of the cordial reception received everywhere, especially in Durban. The last leg of the flight, from the Maldives, was delayed for five days due to engine trouble in one of the boats.

ESCAPERS REUNITE: With members of the Belgian "underground" as their guests, the R.A.F. Escaping Society lately held a reunion. F/O. Lloyd exhibits a fake identity card made for him by M. Drion (left). Other personalities are F/L. Dales, M. Méan and Mlle. Didier.

Fine Work in India

OVER 12,000 passengers, mainly refugees, were carried by R.A.F. aircraft between the Dominions of India and Pakistan from the middle of August to the end of September. During this period the aircraft flew 3,741 hours and covered 643,000 miles without incident. The work goes on.

The total of 12,769 was made up as follows: *Indian*—4,137 refugees; 414 Royal Indian Air Force; 1,512 Indian Army; and 20 families. *Pakistan*—2,214 refugees; 1,188 Royal Pakistan Air Force; 244 Pakistan Army; and 50 families. British Service personnel and families accounted for 2,790.

Two transport squadrons of Dakotas have been temporarily loaned to the two Governments and are assisted by the Supreme Command H.Q. Air Communication Squadrons, and three Yorks of Transport Command sent from England. During one operation, as already recorded in *Flight*, a York carried 117 refugees—a record load for this type.

PARLIAMENTARY PUPIL: Flight Lieutenant F. Beswick, M.P., reported to No. 1 Reserve Flying School on Sunday, October 5th. He is seen, after going solo, with Mr. G. S. Lindgren, M.P., W/C. V. R. Moon, A.F.C. (in "civvies"), and the C.F.I., W/C. I. E. Stewart.

Lincolns in Turkey

SIX R.A.F. Lincolns, led by A.V-M. S. C. Strafford, arrived in Istanbul on October 13th on a seven-day visit to Turkey. They flew over President Inönü's residence at 500 feet. The Turkish Government has prepared a programme of receptions and entertainments.

Lady "Boffin"

MISS LILY KATHLEEN HARRISON, a government scientific worker engaged in the development of civil aircraft, is one of fourteen members of the Ministry of Supply training as pilots at No. 3 R.A.F. Elementary Flying School, Shellingford.

New Wing for Cranwell

THE R.A.F. College, Cranwell, completed its first peacetime year last Friday. Four courses of flight cadets have been entered during this year and by January, 1949, Cranwell will be restored to its full capacity of 320 cadets, all destined for the G.D. Branch.

The scope of the College, it is announced, is to be extended. Hitherto only officers for flying duties had been trained there, but now a new wing has been added to give equivalent training to cadets for Equipment and Secretarial Branches of the Royal Air Force. This Wing for the present will be located at R.A.F. Station Digby. It will have a capacity for 110 cadets. The first entry to this new venture will be for the present Michaelmas Term.

Although the wing is some distance from Cranwell it will be an integral part of the College, controlled by the Commandant, Air Commodore R. L. R. Atcherley, C.B.E., A.F.C. The Director of Studies, Mr. Patrick Johnson, will include it in his responsibilities. The Commanding Officer of the Wing is Group Captain R. G. Seymour, C.B.E.

Reunion

IT is proposed to hold a reunion dinner for officers of 34 Wing, R.A.F. Those interested should write to R. E. White, 6, Clifton Gardens, London, W.9. Telephone: CUN 0570.